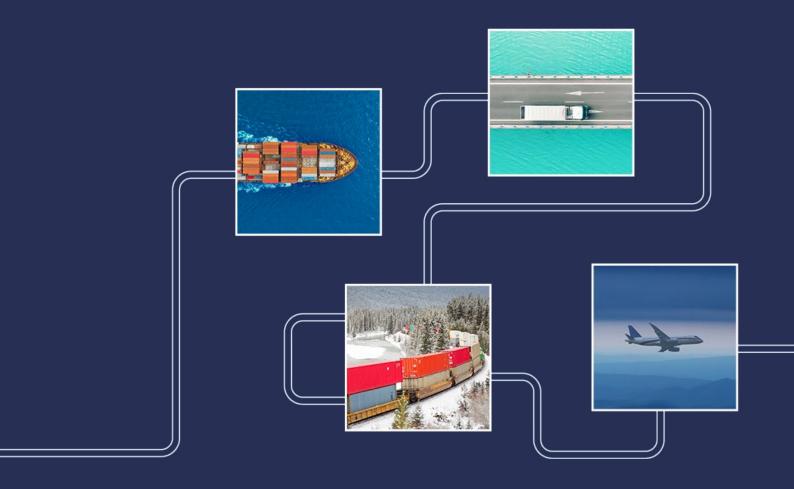
On the move:

Rethinking transportation and logistics supply chains

Part 2: The transportation and logistics industry

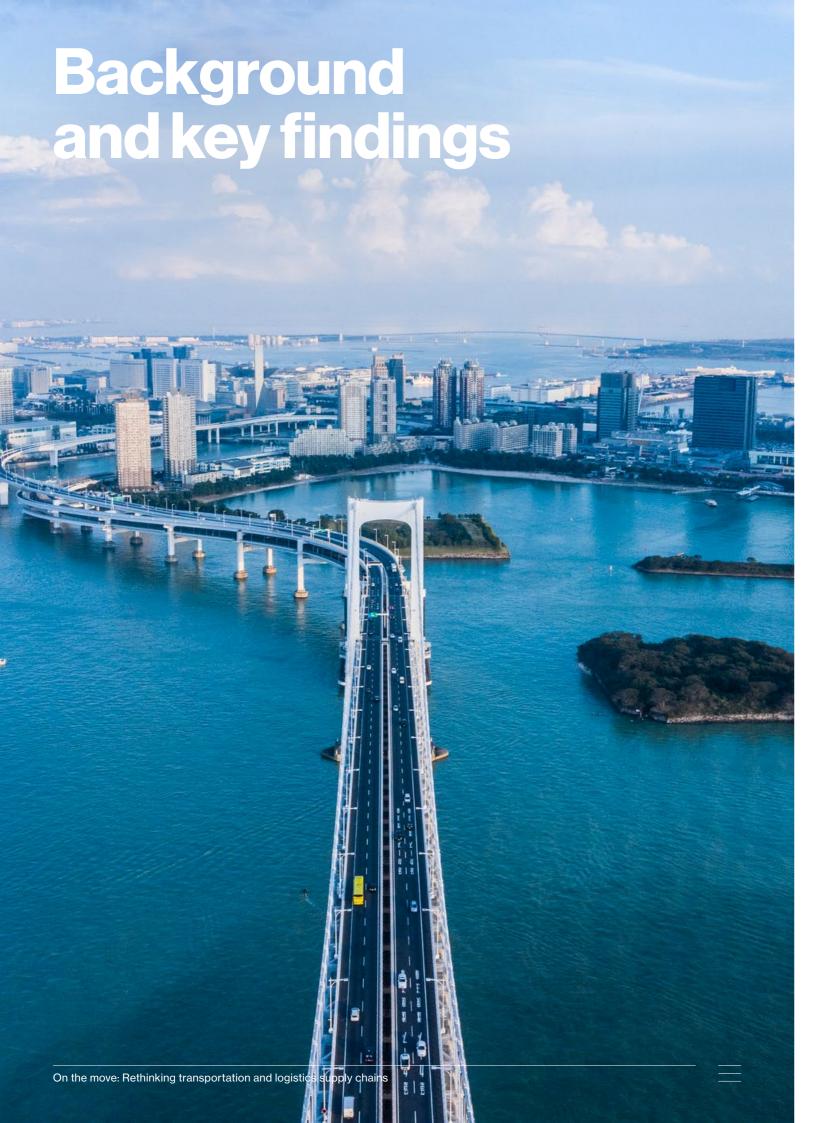




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Key:

- Client quotes
- Insurance case studies
- Acceleration opportunity with industry partners
- General sector insights



Background and key findings

Every industry, government, and consumer relies on transportation and logistics companies to get their goods from raw materials to end consumers, and in the last few decades the sector has powered global growth by enabling 'just-in-time' business models. As the industry has grown in size, volume, and complexity, the associated risks have also increased.

Understanding the industry and where it touches every sector through transporting raw materials, components and finished goods is important to every insured and insurer. Where the <u>food and drink industry supply chain</u> can be considered relatively linear, and the <u>semiconductor supply chain</u> multidimensional, the transportation and logistics companies move all tangible goods that make up the global economy. Some risks are within an organisation's control and others – like geopolitical risks – have elements that can extend beyond the balance sheet of any one institution.

This report examines transportation and logistics supply chain risks and the ways companies are responding through a survey and interviews with over 120 businesses operating in the sector to provide the insurance industry with a greater understanding of customer needs, protection gaps and potential insurance solutions (see **Section 3**). This section provides a profile of the transportation and logistics industry and the needs of businesses operating in the sector.

Key findings include:

- Transportation and logistics companies have always been at the sharp end of supply chain risk and
 respond to operational events and balancing capacity every day. They take risk seriously: investing
 heavily in redundancies, ensuring they have robust contingencies in place, sharing resources and
 building partnerships within the industry. As seen in the semiconductor industry, transportation
 and logistics companies have deep partnerships within their industry
- Six key supply chain risks and drivers are currently at the forefront of the minds of transportation and logistics businesses: sustainability, decarbonisation and ESG; technology; labour; business model; and regulation. Global trade, geopolitics and geoeconomic risk were other key issues highlighted in our discussions with businesses in the sector
- Most companies we spoke to demonstrated a rising awareness of risk and growing complexity as companies acquire different modes to gain greater control over delivery and inherit their risk landscape and regulatory responsibilities. However our research has shown a range of risk maturity seen across the companies we spoke with some very advanced in their journeys and others knowing they need to catch up. There was also a range of understanding of supplier resilience, ranging from high level information only to progressive part sharing warehouses with competitors to pool resources
- The insurance industry can play a significant role in the protection of the billions of dollars' worth of investment being made in transportation and logistics. Increased collaboration can provide opportunities for insurers to demonstrate the value of insurance and grow in partnership with the transport and logistics sector. Lloyd's, through platforms such as Futureset and the Lloyd's Lab, and the brokers who advise customers as risk partners can help to convene stakeholders and support conversations and enable new partnerships to be forged

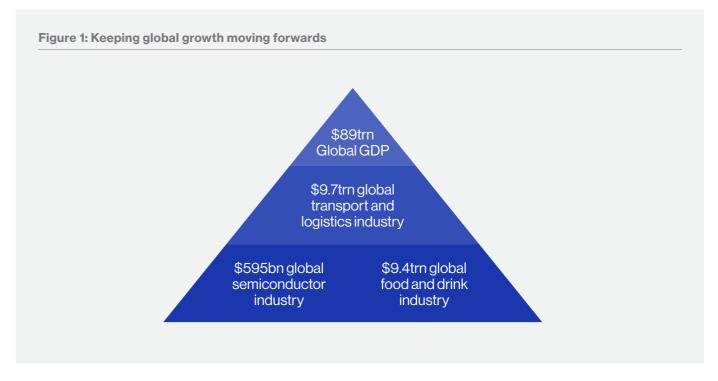
An introduction to the transportation and logistics industry On the move: Rethinking transportation and logistics supply chains

An introduction to the transportation and logistics industry

Transportation and logistics companies connect every country and industry. The industry keeps global progress on the move and recovered from COVID-19 to hit a total market size of \$9.7trn worldwide in 2023!

One of the first signs of modern logistics that rely on systematic distribution can be seen written in the military history of ancient Greeks and Romans to provide support for their long campaigns². Today, fuelled by the development of internal combustion engines and emerging technologies, companies around the world may have entire departments dedicated towards logistics. From single parts in envelopes to the intermodal container that revolutionised world trade, different modes of transportation move goods around the world at different speeds and volumes.

Transportation and logistics companies offer a global network of connections and capabilities depending on the routes and speeds needed. Economies of scale and efficiency have enabled the rapid globalisation of supply chains over the last 30 years and between 1950 and 2020 world trade volumes have grown by an estimated 4,100%³. Costs have fallen with larger ships, more efficient transport mechanisms and offloading capabilities, and consumers and users of their services have quickly become used to the just-in-time business model. With the rise of e-commerce, companies are now handling a larger volume of shipments than ever before, and this increases the risk of loss or damage. This makes insurance an essential component of risk management, providing coverage against potential financial losses resulting from various incidents that may occur during the transportation of goods.



Source: AMD SEC filing, Statista

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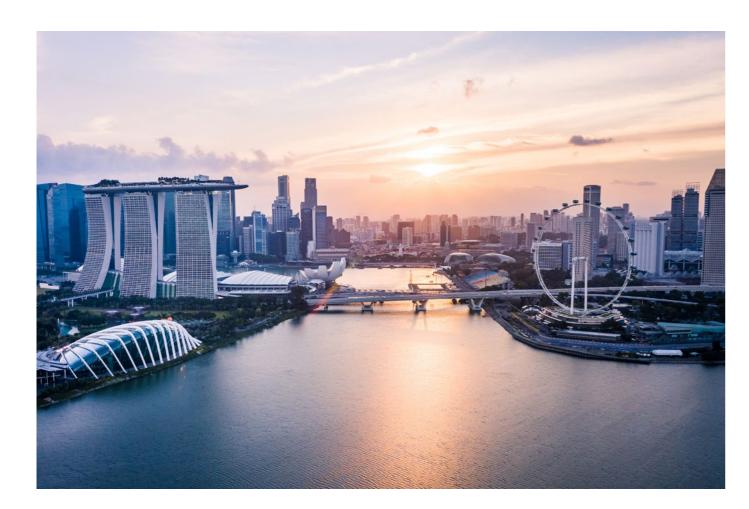
Without transportation and logistics, supply chains grind to a halt, as the world discovered during the pandemic and global trade sanctions as a result of the conflict in Ukraine. This was underlined again by the Ever Given incident, when one massive container ship blocking the Suez Canal was enough to throw a large proportion of global trade off track with an estimated \$9.6bn of global trade held up every day⁵.

Companies in the transportation and logistics industry are amongst the world's largest companies. UPS has an enterprise value of \$167bn⁶; Maersk, the world's largest shipping line, is \$222bn⁷; and Kuehne + Nagel – a large Swiss third party logistics company (3PL) - is \$32.9bn8.

As we emerge into new consumer-fuelled trading conditions and reglobalised trade relationships, businesses and governments around the world and industry are reconsidering how they move and store goods between their supply chain nodes and looking to logistics providers to help them improve and optimise. In turn, these companies are looking to insurers to support their risk management activities and provide them with suitable risk transfer solutions in order to stay competitive.

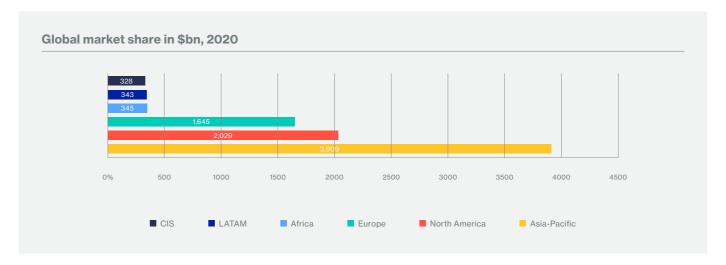
Protecting this growth will be essential. Industry research forecasts that global transportation and logistics market may reach \$13.8trn by 20289, growing at a compound annual growth rate (CAGR) of 6.23%. In the short-term, the conflict in Ukraine, inflation, and fears of a global recession threaten a slowdown in the performance of many companies and the associated logistics market.

Asia-Pacific has the largest market size worth about \$3.9trn in 2020. This has been driven by the expansion of trade routes and the shift of industrial production to Asian countries the last few decades. Shipping dominates the region and global trade, with container trade flow within Asia reaching a volume of 41.5m TEUsi in 202110. The rapid growth of the transportation industry in emerging countries has been fuelled by increased foreign direct investment (FDI), the establishment of free trade zones, and reglobalisation trends.

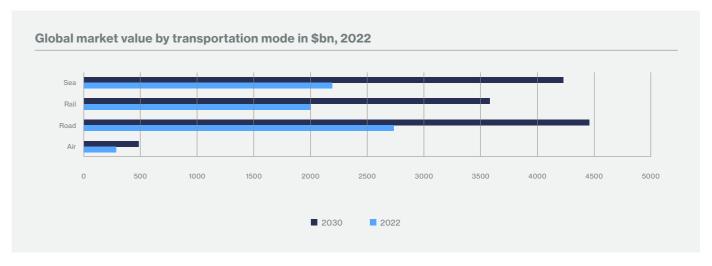


^{&#}x27;reglobalisation' is a term used most recently by WTO Director General Ngozi Okonio-Iweala, as the current and likely future trends of greater economic integration that is taking place in some areas alongside the fracturing of the global economy in others.

Figure 2: Understanding market dynamics11



Note: Commonwealth of Independent States (CIS) countries engage in political, economic, trade, and cultural cooperation; they share a free trade area and a visa-free regime. They include: Armenia, Azerbaijan, Belarus, Kazakhstan, Kyrgyzstan, Moldova, Russia, Taiikistan, and Uzbekistani



Source: Market research reports¹³

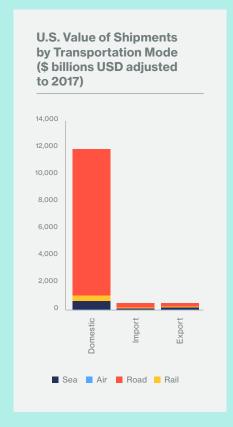
At a country level the demand and share of transportation varies widely depending on geographic factors and intra-country and global trade patterns. Countries with long distances to coasts or no access to the sea have unsurprisingly invested in other forms of transportation and logistics. Tonnes per kilometres are often used measurements in exploring the share of goods moved across different modes. However, they don't tell the full story and varies across the world – as highlighted in Figure 3 that explores European Union (EU) trade with the rest of the world and the view in the United States (U.S.) where trucking dominates internal movement of goods.

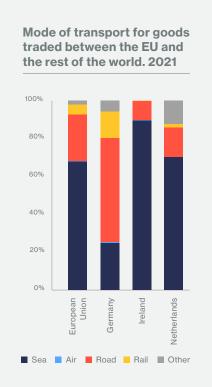
The standard container size is 20 feet long, eight feet wide and nine feet tall – a size that's become known as a "Twenty-foot Equivalent Unit" or TEU.

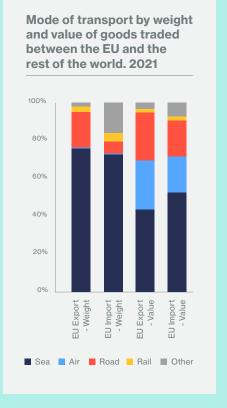
Figure 3: No one standard view. Understanding trade dynamics and transportation modes

In 2021, EU exports were valued at €2,181bn and imports €2,119bn¹⁴ - with differences between EU countries depending on the geographic factors, for example access to the sea. The picture also shifts when factoring in whether goods are being imported, exported, or traded domestically.

In 2019, the U.S. transportation system moved a daily average of about 55.2m tonnes of freight valued at more than \$54bn. The largest percentage of goods – approximately 74% of the weight and 56% of the value of goods – moved less than 250 miles between origin and destination in 2022. In contrast, about 7% of the weight and 17% of the value of goods moved 1,000 miles or more. Trucks via roads carry the largest shares by value in both current and constant dollars for shipments moved less than 2,000 miles, while rail is the dominant mode by weight and tonne-miles for shipments moved 1,000 to 2,000 miles in 2020. In the U.S., the top 10 commodities by weight accounted for 67% of total tonnage, while the top 10 commodities by value accounted for 59% of total value of goods moved in 2019¹⁵.





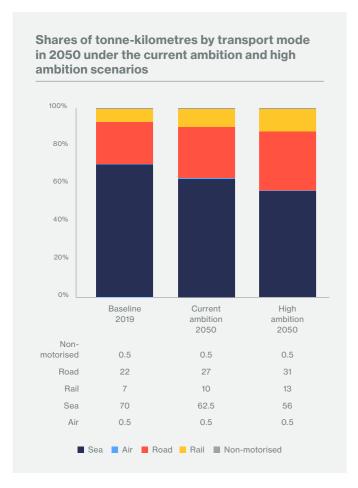


Note: Weight is calculated as tonnes per kilometer. Germany, Ireland and Netherlands data represents % by tonnes per kilometer. Source: U.S. Department for Transportation, Bureau of Transportation Statistics¹⁶ and Eurostat¹⁷

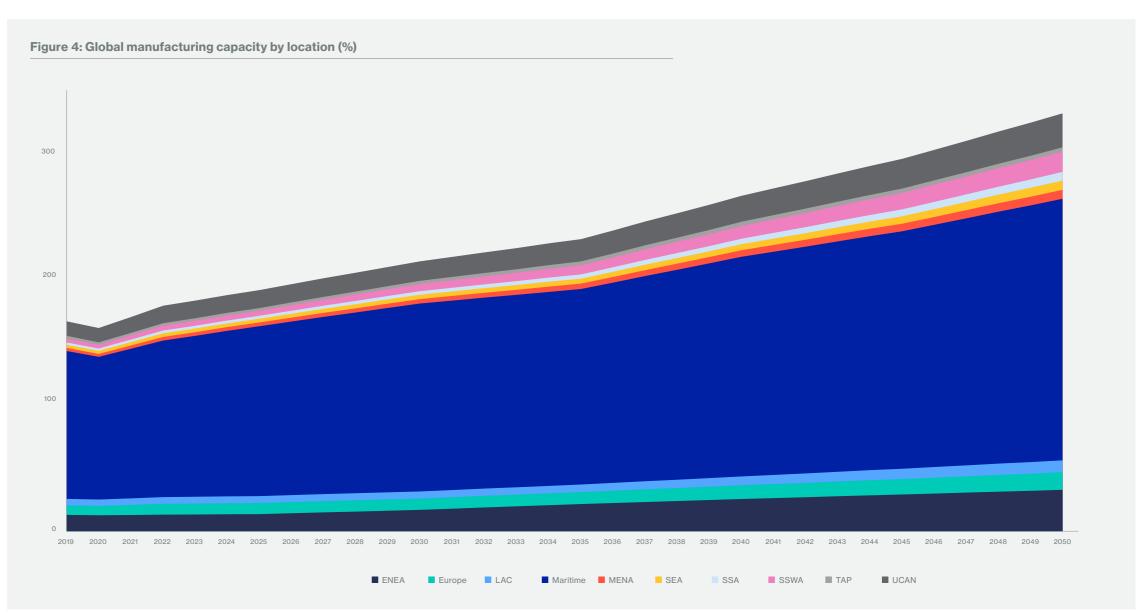
Future trade projections

This is also subject to change going forwards. The transport sector plays a significant role in increasing access to opportunities and is a crucial enabler for the 2030 Agenda for Sustainable Development¹⁸. The OECD's International Transport Forum (ITF) publishes a global outlook of current trends and future transport demand and the associated emissions to support policy scenarios¹⁹. The 2023 ITF Transport Outlook models two scenarios – one informed by announced or existing policies (current ambition) and a second assuming more ambitious decarbonisation measures (high ambition scenario). Maritime transport is expected to continue to dominate freight activity regardless of scenario; however, road and rail modes are expected to more than double their share under both scenarios.

Figure 4: Projected freight transport demand by region and mode



Source: OECD ITF 202320



Attributes of the transportation and logistics industry

Operational Resilience Strategy Changing trade patterns - The transportation and logistics industry is subject to varying - Transportation and logistics covers different methods, - Transportation and logistics companies need to have the flexibility - Transportation companies are subject to changing trade agreements levels of consumer demand and economic activity more broadly. predominantly by road, rail, sea and air, Each mode offers to adapt and recover from supply chain disruptions to ensure and geopolitical trends. Examples include renegotiation or withdrawal The use of capacity management is crucial in ensuring there is a different cost and speed proposition. Often, these varying survival. To mitigate this, contingency planning is used to prepare of multilateral agreements such as the North American Free Trade Agreement (NAFTA) and the Trans-Pacific Partnership (TPP) always enough capacity to meet inconsistent levels of demand for potential disruptions and improve chances of success. Risk methods act as one complete journey of a product like the consideration of production schedules and delivery times management, mitigation planning, understanding the supply chain - Often, a single destination will receive many shipments from multiple - The global footprint of state-owned enterprises, especially and business continuity planning hugely influence resilience - Strategic forecasting is increasingly important to predict suppliers. Careful planning and communication is required to ensure from China, is growing²³ inventory and sourcing requirements allowing adjustments these shipments arrive at the right place at the right time. Freight - A robust infrastructure to minimise route disruption and diversifying - Constant regulatory changes influencing the industry, such as to stay within tolerances forwarding is the industry recognised solution for this methods of transportation, suppliers and warehouse locations a tighter governing of driver hours in a competitive environment is crucial to ensure agility and survival in a competitive fast - Technology like artificial intelligence (AI) and blockchain to track - Logistics and transportation of goods is complex and requires large - Tighter contracts as a result of economic pressures such paced industry shipments to optimise route efficiency, increasing visibility through warehousing to store and handle goods between transportation as inflation, driver shortages, rising fuel prices result in less the use of Global Positioning System (GPS), automating processes - Technology proves to be a huge resource when looking to recognise stages. Companies need to ensure they have enough warehousing scope to compromise on prices to reduce staffing costs and creating a better customer experience space to accommodate their inventory. The locations of these efficient logistical processes and modernise processes to minimise warehouses need to be strategically placed to ensure a smooth unnecessary disturbances all show a positive upwards trend in producing a seamless and fulfilling experience operating process - Today's forward-looking enterprises are dynamic and have - Companies have tended to extend their domestic business - The movement of products between locations brings with it hazards collaborations with business stakeholders such as suppliers, logistics to global logistics (GLs) because of their international of physical injury and inefficiencies which could damage reputations. customers, and some competitors. They use modern markets and customers. Onshoring and increasing product Procedures to ensure the safety and efficiency of the movement technologies and share information and knowledge demand is also increasing pressures to invest in smaller more of these goods from manufacturers to end customers are essential. in an effort to create a collaborative supply chain local fulfilment centres, which is capital heavy Given the many stages of delivery of an end product, production, - Identifying investment opportunities such as automation storage, delivery and distribution there are multiple touchpoints - In recent years the volume of e-commerce and the number of to increase efficiency puts companies in a position of where risk could occur urban deliveries has steadily increased21. By 2030, cross-border proactiveness rather than being reactive - Business sustainability remains a challenge with companies having e-commerce in goods is expected to grow to \$1–2trn in merchandise value from its current \$300bn²², resulting in substantial changes to use alternative fuels, replacing machinery with new efficient in supply chains. This ongoing trend, which accelerated during the alternatives and related costs means an increase in consumer prices in reaction to this pandemic, directly affects the number of vehicles needed to meet transport demand, as well as the number of delivery trips made

When we talk about 'smart transportation', it is more than moving cargo from A to B. Digitisation within transport and logistics means seamless service to our customers, visibility in the supply chain, and driving a more efficient business.

by these vehicles

CEO, Global Marine Shipping

Without logistics the world stops. Transport & logistics industry expert

Without freight rail, many U.S. industries would shut down... Communities could lose access to chemicals necessary to ensure clean drinking water. Farms and ranches across the country could be unable to feed their livestock²⁴.

U.S. President Joe Biden

No supply chain can properly operate without a global system of predictable and facilitating trading rules, such as the one the WTO operates. But these rules alone can do nothing for trade if supply chains are being physically interrupted. All constituents of the world trading system - from the private sector to governments, regulating authorities and international organisations - must now play their part in a response²⁵.

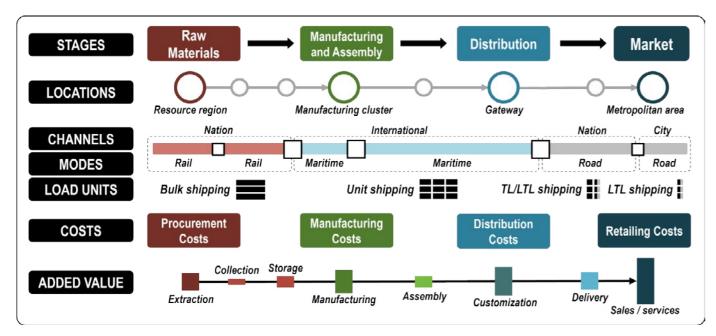
WTO Deputy Director-General Jean-Marie Paugam

Keeping transportation and logistics on the move: How they work, market drivers and trends

The transportation and logistics supply chain is global and made up of moving parts and stationary storage through warehousing. Each company may specialise in one or more steps of the process, with an increasing trend of companies acquiring different capabilities to control end-to-end delivery. There are also third party logistics providers (3PLs), who provide supply chain management including inventory management, warehousing and fulfilment (often road freight transport); and more recently fourth party logistics providers (4PLs) that integrate the services of multiple 3PLs to manage the clients' supply chain.

For international trade, freight forwarders contract with a carrier or multiple carriers on behalf of the shipper to move goods from one country to another using ships, planes, trucks and railways and multiple modes for a single shipment. Freight forwarders help to manage the customs and other documentation required for import, export and transhipment.

Figure 5: Transportation and logistics subsectors



Note: Outside of individual packages and small, specialised containers, there are two main classifications of freight goods: bulk products and intermodal containers. The former category can refer to aggregates, cement, grain, biomass, oil and petroleum, for example – the product is fundamentally a loose product. The second category, intermodal, refer to the transportation of goods in standardised containers that facilitate transfer between road, rail and sea.

Source: The Geography of Transport Systems²⁷

Transportation and logistics companies can be classified into a series of different business models and transportation modes. To carry out this research we have spoken to companies all over the world who represent these different areas to gain a view of the issues on their minds and their attitudes towards risk and insurance.

- Regional specialists: Dedicate themselves to their markets and operating within fixed trade borders or landmasses
- Journey stage specialists: Concentrate efforts on specific stages of the above journey, such as warehousing or distribution
- Mechanism specialists: Focus on specific modes of transportation as outlined below, concentrating on their specialist capabilities. They may operate globally or within region(s)
- End-to-end specialists: Do it all and are some of the world's largest companies in value and geographic reach, operating from raw materials coming out of the ground to delivering final packages at end destinations. In many cases they are the result of sustained mergers and acquisitions to fill gaps in their capabilities

These business models are made up of – and rely on – key transportation and logistics mode subsectors with trends and example companies outlined in the appendix. The availability and quality of transportation infrastructure and warehousing differ between countries and transport modes, as does the availability and quality of vehicles and logistics service providers:

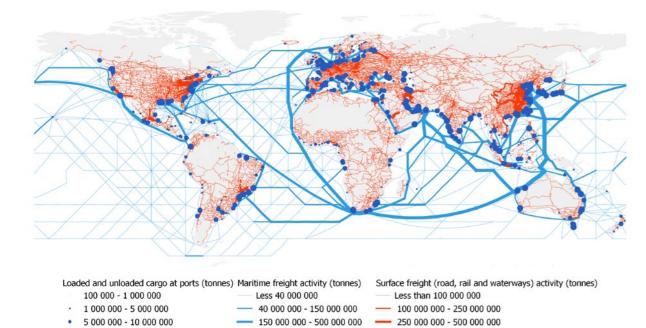
- Road: The road network allows access to most industrial sites, ports and terminals and is usually the first access mode that is constructed within countries. It also requires little investment by commercial users as construction and maintenance is enabled by governments and taxation. Road freight is usually classified as Full Truckload (FTL) or Less Than Truckload (LTL). Another classification occurs in the size of vehicles with distinctions between Light Commercial Vehicles (LCVs) which weigh less than 3.5 metric tonnes and Heavy Goods Vehicles (HGVs) of over 3.5 metric tonnes
- Rail: Rail freight transportation is the use of railways and trains to transport cargo/freight/goods. Trains
 are typically a group of wagons hauled by one or more locomotives on a railway network, between the
 shipper and the intended destination as part of the overall logistics supply chain. Using fixed infrastructure
 makes it less prone to disruptions, but also means that goods have to be brought to a rail terminal if a site
 has no connection to the railway network. A common application for rail freight is transport of regularly
 scheduled and heavy bulk loads
- Air: Is the fastest available transport mode over long distances and also the most expensive. Air cargo transports over \$6trn worth of goods, accounting for approximately 35% of world trade by value, but only a fraction of the weight²⁸. The airfreight world tends to run along "trade lanes." The two biggest trade lanes carry goods from Asia to North America and from Asia to Europe²⁹. Freight is moved either in the hold of passenger aircraft or in dedicated air freighters and because of cost is typically either high value or time critical goods. Air freight is critical to some high value add industry supply chains, such as semiconductors and most recently pharmaceuticals moving COVID-19 vaccines
- Sea: Maritime shipping is the backbone of world trade, and it is estimated that 80% of all goods are carried by sea. Sea freight, whether in containers or in bulk, is generally a slow but cost-effective option for the transportation of large or low-value/high-volume items. As well as container ships bulk carriers transport crude oil, refined petroleum products and liquid natural gas as well as biomass, agricultural products, and commodities such as steel. Usually there is always a need for double handling, as goods have to be brought to and away from the port

The interconnectedness of transportation systems can lead to resilience when one mode of transport can be substituted for another in the case of a disruption. For example, freight could be transported via inland waterways if rail or road transport are disrupted. Investments in infrastructure support sustainable growth and resilience and need to be upscaled. In the U.S. alone, the infrastructure investment gap to maintain critical and aging infrastructure is \$500bn on average per year until 2040³⁰. Partnering with the private and public sector, the insurance industry is critical for strengthening society's resilience to climate risks, by investing in and underwriting sustainable infrastructure – this will be critical with the future growth that is projected.

An introduction to the transportation and logistics industry

Figure 6: Current and future transportation and logistics supply chain flows

Movement of goods in 2022



--- 500 000 000 - 1 000 000 000 **---** 500 000 000 - 1 000 000 000

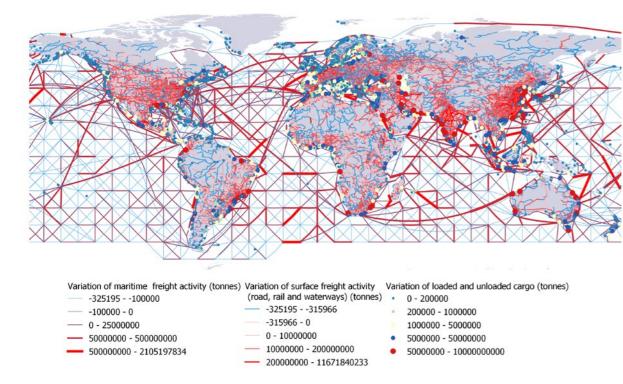
More than 1 000 000 000
More than 1 000 000 000

Source: ITF Transport Outlook 2023

Movement of goods in 2050

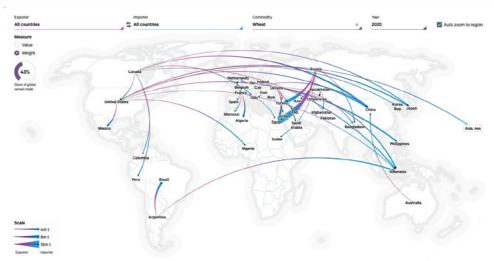
• 10 000 000 - 50 000 000

More than 50 000 000



Source: ITF Transport Outlook 2023

Food and drink wheat trade flows



Food and drink: 11% of internationally traded maize, wheat, rice and soybean now depends on one or more of the maritime chokepoints as the only viable shipping option³². In 2017, Chatham House were already warning that 91% of grain exports and 23% of exports of potash and phosphate fertilisers were from countries that currently impose export restrictions or have done so in the past decade. Understanding the trade flows and paths for transportation and logistics is key to understanding current and future supply chain risks.

Semiconductor palladium trade flows



Source: Chatham House³

Semiconductors: As highlighted in our previous report, Loose connections, semiconductor companies are reviewing their business continuity plans, seeking alternative sources of critical raw materials such as palladium and exploring neon gas recycling. With few global sources of palladium, understanding the trade flows and paths for transportation and logistics is key to understanding current and future supply chain risks. In 2021, research by the British Geological Survey³⁸ highlighted that Russia (39%), South Africa (38%), Canada (9%) were key sources of technology critical minerals and metals, and sources of economic vulnerability to any disruption.

Key global transportation and logistics facts



Over \$3trn of world trade traverses through the South China Sea. The Malacca Strait connects the Indian Ocean to the Pacific Ocean, About 40% of world trade goes through it. The passage is vital for China and other East Asian states, and is increasingly essential for India's trade. About 12% of world trade goes via the Suez Canal and about 5% through the Panama Canal³³



With 250,000kms, the U.S. has the largest rail network in the world, with 80% of that accessible to freight. China is the second largest at over 100,000km, followed by Russia at 85,000km, India at 65,000km, and Canada at 48,000km³⁴



The top 3 airports supporting cargo in 2022 included: Hong Kong (HKG) with 4.2m tonnes (+16.4% from 2021) remained the top ranked airport followed by Memphis (MEM) with 4m tonnes (-9.8%) and Anchorage (ANC) with 3.5m tonnes (-4.3%)35



According to the American Transportation Research Institute, the top 3 congestion bottlenecks for U.S. trucking are: Fort Lee, New Jersey I-95 at SR 4, Chicago, Illinois: I-294 at I-290/I-88, and Houston, Texas: I-45 at I-69/US 5936

Supply chain risks in the transportation and logistics On the move: Rethinking transportation and logistics supply chains

Supply chain risks in the transportation and logistics industry

The transportation and logistics industry enables companies to offer customers the products they desire, when they want them and where they want them, efficiently and economically. Transportation and logistics supply chains are global in nature, often very sensitive to disruptions and subject to the related factors that may cause the disruptions. Some supply chain risks are within an organisation's control and others – like geopolitical risks or extreme weather – have systemic elements that go beyond the balance sheet of any single institution.

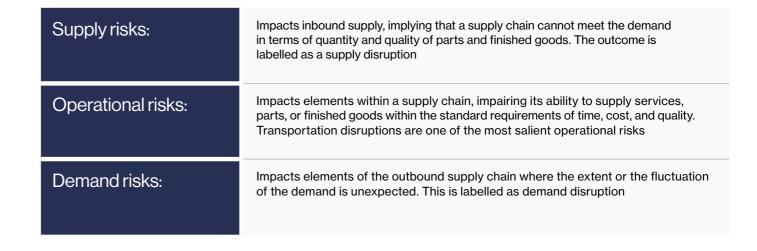


Figure 7: Supply chain risks and drivers

Factors Supply Geopolitical **Environmental Economic Technological** - Natural disasters - Political instability - Demand shocks - ICT distruptions Operational Demand - Extreme weather - Trade restrictions - Price volitility - Infrastructure risks risks failures - Pandemics - Terrorism - Border delays and epidemics - Disruptive - Corruption - Currency technology fluctuations - Theft and - Transition risks - Energy shortages illicit trade - Piracy - Inflation and consumer demand Source: Various³

Transportation and logistics companies enable global trade and progress, keeping goods on the move. Over the past four months, we have surveyed and interviewed over 179 risk, supply chain, and insurance practitioners, and these perspectives have provided real-life, practical insights into the challenges that companies across the transportation and logistics industry are facing as a result of the highly interconnected world we live in, and a historic – but now changing – reliance on just-in-time business models. Every industry around the world that creates and deals with physical assets relied on their capabilities, therefore understand the way they view risk is essential.

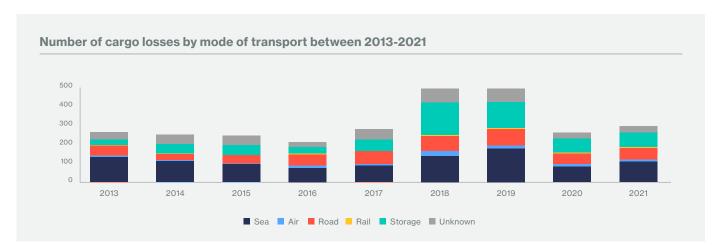
Box 1: Recent trends affecting transportation and logistics supply chains

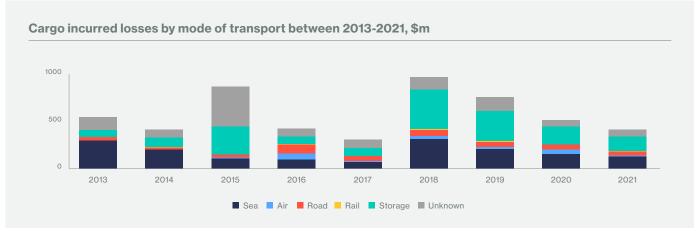
- E-commerce: The rise of online shopping since 2000, and particularly since the COVID-19 pandemic, has led to an increase in demand for faster and more efficient delivery of goods. As a result, transportation and logistics companies are investing in new technologies to improve their operations and meet customer expectations
- Sustainability: There is growing concern about the environmental impact of transportation and logistics. As a result, companies are investing in alternative fuels, electric vehicles, and other sustainable technologies to reduce their carbon footprint
- Climate risks: In 2022, the world saw major examples of transportation disruptions can result from drought. The Mississippi River, for example, carries 92% of U.S. agricultural exports, and its water levels dropped to the lowest levels in 34 years⁴⁰. Drought also impacted key European rivers and water scarcity lowered summer crop yields⁴¹
- Digitalisation: The adoption of digital technologies, such as the Internet of Things (IoT), cloud computing, and artificial intelligence, is transforming the transportation and logistics industry.
 These technologies are enabling companies to optimise their operations, reduce costs, and improve customer service
- Supply chain disruptions: The pandemic has had a significant impact on the transportation and logistics industry. Restrictions on movement, supply chain disruptions, and reduced demand for some goods and services have affected companies across the industry. Other events such as the Suez Canal blockage in March 2021, which disrupted global supply chains and caused delays and increased costs for many companies has also taken its toll
- Last-mile delivery: Last-mile delivery is becoming increasingly important as more consumers shop online. Transportation and logistics companies are investing in new delivery methods, such as drones and autonomous vehicles, to improve the efficiency of last-mile delivery
- Cyberattacks: Cyberattacks on transportation and logistics companies such as Swissport,
 Expeditors International and Maersk have become increasingly common in recent years.
 These attacks can disrupt operations, compromise sensitive data, and cause financial losses
- Driver shortages: The transportation and logistics industry has experienced a shortage of drivers in many regions. Irregular working hours, low pay and ageing workforces has led to increased competition for drivers, higher wages, and higher transportation costs
- Trade wars and tariffs: Ongoing trade disputes between countries⁴² and embargoes as a result of geopolitical instability, has affected global supply chains and led to increased costs for some companies. Overall throughput at Hamburg terminals fell by 6.8% to 119.9m tonnes, with the conflict in Ukraine, global supply chain issues and local labour disputes pointed at as sources⁴³. The imposition of tariffs on goods has also affected trade flows and logistics operations⁴⁴

Examples of supply chain trends and losses

Not all risks can be mitigated and when supply chain disruption events occur and impact physical assets they can result in high losses, both for the industry and for those who depend on their capabilities to keep goods on the move. Examples of historic supply chain events and losses have been outlined on the next page to raise awareness. There is also value to be gained in considering events not in the data, through counterfactuals to stress test forward looking assumptions.

Figure 8: Insured cargo losses by mode of transportation





Source: IUMI Claims Database⁴⁵ International Union of Marine Insurance established a database in 2018, which now contains ~11,000 claim records from 27 countries that sum up to -\$17.3 bn of total losses. There is an ongoing invitation for further associations to join their data collection efforts.

Vesselloss Strikes Maritime chokepoints Roughly \$270bn of cargo crosses the canal each In March 2022, the fire and subsequent sinking of the year. It serves more than 140 maritime routes to over ro-ro carrier Felicity Ace with the loss of some 4,000 80 countries⁴⁶. In Panama, events related to excess vehicles, put the risks associated with transporting rainfall, such as "La Purisima" in 2010 and the floods electric vehicles (EVs), and the lithium-ion (Li-ion) in the Province of Colon in 2012, caused losses of batteries that help power them, firmly in the spotlight⁵¹. more than \$270m and forced, on one occasion, the As risks in this area continue to unfold insurers may temporary closure of the Panama Canal operations⁴⁷. wish to explore industries focusing on battery In 2015, ocean carriers were forced to cancel services technology and how they are shipped. and make costly adjustments in the wake of congestion In 2019, the car carrier MV Golden Ray capsized off at the Panama Canal. Delays of up to 10 days were the coast of Georgia, U.S., while carrying 4,200 new experienced in late October and early November by industrial action55. cars. The ship's value was estimated to be around container ships on both the Atlantic and Pacific sides \$50m but a complex removal cost was over \$500m - a significantly longer canal transit time than the During the process of breaking up the wreck, a fire average 24-30 hours⁴⁸. In March 2023 a vessel had broke out due to hot work causing another loss⁵². a near miss with a lock gate that could have caused According to the maritime body the International Union alobal delays49. of Marine Insurance, a fire breaks out on a container In March 2021, the Ever Given was on its way from ship every 25 days, usually in connection with cargo⁵³. Taiwan to Rotterdam with approximately 18,300 Allianz Global Corporate & Specialty analysis of shipping containers onboard when the vessel was over 240,000 marine insurance industry claims wedged across the width of the waterway. As the ship between January 1, 2017, and December 31, 2021, completely blocked all traffic, around 400 other ships worth approximately €9.2bn in value, shows that were also delayed and forced to wait for their turn these are the most expensive cause of loss, to pass through the canal. It will take many years to accounting for 18% of the value of all claims54. settle the claims from the Ever Given and the process will include much debate about who is liable, with SCOR estimating that reinsurers may have to absorb the bulk of the claims, which could amount to more

2022 saw a large increase in labour disruption around the globe, with a 92% year-on-year increase on this front. Examples of this are the protests at the Foxconn iPhone factory in China, and the Felixstowe port strike in the UK. The strike in August 2022 at the UK Port of Felixstowe resulted in \$800m of disrupted trade, after an estimated 1,900 workers went on a nine-day strike in a dispute about a pay increase. Russell Group analysis shows that clothing (\$82.8m) and electronic components (\$32.3m) were most impacted by the

In the U.S. fire departments respond to an estimated average of 1,450 structure fires in warehouse properties per year (excluding refrigerated or cold storage), causing an annual average of \$283m in direct property damage⁵⁶.

India's largest container port – Jawaharlal Nehru Port (also known as Nhava Sheva Port) – experience protracted labour unrest in 2015 with widespread industrial action between January – August. Go-slows and strikes by crane operators and truck drivers at halted almost all operations, creating cargo backlogs and congesting road routes both into and out of the key terminals. Many companies-imposed emergency surcharges with shipping diverted to alternative terminals and ports⁵⁷.

Derailments Factory fires

The UK Rail Safety Standards Board estimates that freight train derailment makes up 40% of the risk of operation⁵⁹. The American Association of Railroads has reported that accidents have fallen by 44% since 2000, and accidents caused by track and equipment problems also are trending downward⁵⁹.

Derailments can have a number of causes from maintenance to design, and can also cause significant damage to railway infrastructure and result in major environmental damage (as occurred on 26 August 2020 at Llangennech, when 446,000 litres of fuel spilled at a site that was both a special scientific interest (SSSI) and a special area of conservation (SAC))⁶⁰. In 2020, a freight train carrying crude oil derailed in Saskatchewan, Canada. Several tank cars were breached and an undetermined amount of petroleum crude oil product was released that ignited and a pool fire ensued⁶¹. In 2023, 38 rail cars derailed in Ohio, U.S. and 12 more were damaged by fire in the derailment⁶².

3,609 factory fire alerts were recorded in 2022, up from 1,946 for 2021 – an 85% year-on-year increase. According to research by Resilinc, fires were the most common cause of supply chain disruption for the fourth year in a row, with the U.S. reporting the most fires in 2021 (450), almost triple the incidents of India (150). Germany and South Korea reported just below 150, and Mexico around 100.

In the U.S. in 1982, a distribution warehouse for a supermarket chain saw a claim of over \$100m⁶³. A fire at an Ocado warehouse in July 2021 held up thousands of customer orders. In March 2021, an incident at a major semiconductor factory in Japan halted production for a month but took considerably longer to reach full capacity again⁶⁴. In 2023, cargo underwriters are anticipated to face claim of around \$50m after a warehouse fire in the Netherlands inflicted major damage on a cargo of cocoa beans⁶⁵.

A 2022 fire in Indiana destroyed a 1.2-millionsquare-foot fulfilment warehouse for a major retailer. It required 350 firefighters and 30 fire agencies assisting in fighting the blaze. Damage was significant enough to prevent it from reopening.

Cyber

than \$2bn⁵⁰.

According to research by ENISA, aviation was the most-attacked segment between January 2021 and October 2022, with some 27 incidents recorded. Attacks on road were the second highest, at 24, rail at 21 and shipping with 1866. In 2017, the cyber-attack, dubbed 'NotPetya', affected a vast number of organisations, including Maersk, causing significant financial loss – an estimated \$300m⁶⁷. Maersk was not the intended target of the attack - they just happened to be using a version of Microsoft Windows the malware was designed to exploit. However, Europe saw a string of ransomware attacks on ports throughout 202268. In 2019, Lloyd's published a research report highlighting that a cyber attack on Asia-Pac ports could cost \$110bn⁶⁹, equal to half of all 2018 natural disasters.

Port explosions

In August 2015, two consecutive explosions at a container storage station in China's Port of Tianjin killed more than 170 people, injured nearly 800 and resulted in billions of dollars in damage. On Tuesday 4th August 2020 at 18:07 local time a fire was closely followed by an explosion at the Port of Beirut. The explosion was caused by 2,750 tonnes of ammonium nitrate improperly stored in a warehouse since 2013. A state of emergency was declared in Beirut for two weeks following the event. Estimated damages range from \$3.8-4.6bn⁷⁰ to \$15bn⁷¹. This incident is considered one of the biggest non-nuclear explosions to have been recorded⁷².

Air chokepoints

In 2010 Kenyan farmers who air-freighted exports to Europe had to destroy over 400 tons of cut-flowers when they faced multiple days of flight cancellations, due to the eruption of an Icelandic volcano⁷³. Supermarkets make guarantees to customers around expected longevity of flowers, and with cold storage at airports full, the picked flowers could not be used. Kenya's flower council estimates losses of \$1.3m a day in lost shipments to Europe⁷⁴. Research also suggests further losses of Kenyan beans, mange tout, Thai mangoes, Tanzanian flowers, Israeli fruit and other exotic fruits (figs, papaya and coconuts)⁷⁵.

Earthquakes

Kobe earthquake in 1995 resulted in damage to all 35 container berths, with a reported 9 out of 186 cargo handling berths functional after the earthquake. Port traffic was lost to other Japanese and global ports⁷⁶. Estimates on direct losses vary in the range of about \$85-147bn. Over half of losses were reported as business/industrial losses (\$63bn), and about a fourth to public infrastructure including public facilities at the Kobe port (\$32.8bn)⁷⁷.

The 2011 Tohoku earthquake and tsunami resulted in \$210bn in costs for Japan and affected supply chains across the globe⁷⁸. Unable to ship or receive needed parts, Toyota, G.M., and Nissan all temporarily shut down facilities in both the United States and Japan.

Adverse weather

Torrential April rainfall in South Africa damages infrastructure in KwaZulu-Natal province, closing the Port of Durban for 36 hours and blocking workers and truckers from reaching port terminals⁷⁹.

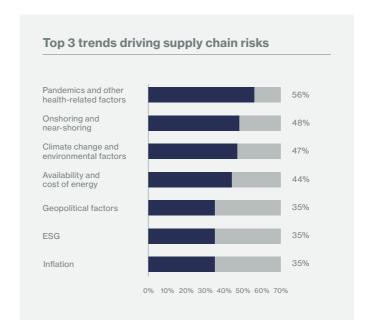
WTW Global Supply Chain Survey 2023

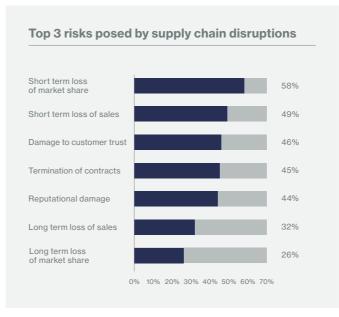
To gain a view on the risk factors playing the greatest role in supply chain risks, what's driving them, and what they expect to face in the short term, as part of this research series, <u>WTW surveyed</u> 100 risk leaders in global transportation and logistics companies.

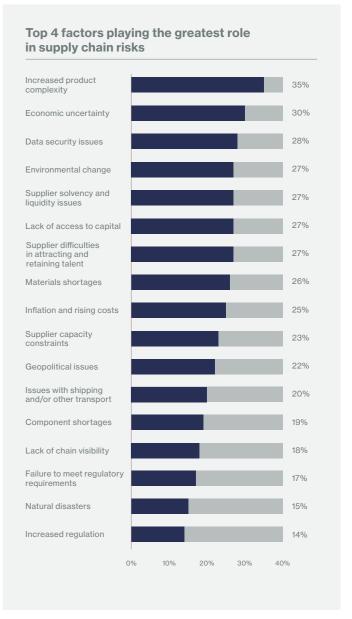
- Increased product complexity and economic uncertainty feature at the top of companies' agenda when managing supply chains. Supply chain losses in the last 2 years caught nearly two thirds of businesses by surprise. Around 4 in 10 companies attributed losses to Covid-related issues and the same proportion said they stemmed from earlier problems
- Pandemics and health-related risks to supply chain were cited by over half of companies as a top 3 risk concern
- Cyber-risks have emerged as a high priority issue affecting the supply chain for almost one third
 of businesses. Similarly, around a third of businesses are concerned about data security risks
- Increased product complexity, environmental change, economic uncertainty and supplier solvency and liquidity issues featured at the top of semiconductor companies' agendas when managing supply chains
- Looking forwards, 76% of companies agree that sustainability of supply chain is their key goal in risk management



Figure 9: WTW Global Supply Chain Survey 2023 key trends, factors and risks for the transportation and logistics industry





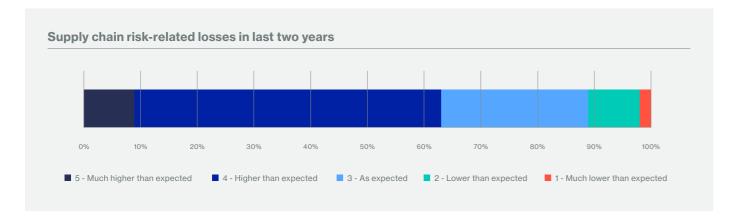


Source: WTW Global Supply Chain Survey 2023

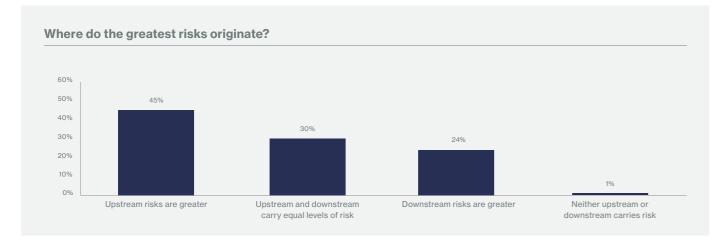
Greater emphasis was placed on supply chain risk originating upstream, although 1 in 3 respondents felt that both up and downstream carried equal levels of risk. As seen in the semiconductor industry, at least half of the transportation and logistics companies feel confident that they have the ability to manage root causes of risks to supply chain, and 7 in 10 felt they had at least some influence over the quality of supply chain risk management. 85% of businesses felt they had to act following the pandemic and made significant changes to the supply chain management, and nearly two thirds of companies are still planning to carry on with improvement and revamp their supply chains in the next year.

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Figure 10: Where do the greater risks to your organisation come from your supply chain?







Source: WTW Global Supply Chain Survey 2023, transportation and logistics companies

Looking forwards, transportation and logistics companies were also asked what supply chain challenges they expect to face in the next two years. While there are many commonalities across the risks that food and drink and semiconductor businesses expected to face, transportation and logistics companies were more concerned about regulation changes, and less concerned about transportation issues as they felt they had greater control over them being their operator.

Figure 11: Supply chain challenges transportation and logistics companies expect to face in the next two years, compared with expectations from the food and drink industry and semiconductor industry



Source: WTW Global Supply Chain Survey 2023

What supply chain risks are transportation and logistics companies concerned about?

Table 1 (below) highlights the key strategic and operational supply chain risks facing the transportation and logistics industry across its global value chain/key subsectors. Notable risks stem from dependence upon national infrastructure and loading, global chokepoints, and the loading/unloading of goods. Some of these key supply chain risks have potential insurability challenges, highlighted in italics and darker row colouring. These include potentially systemic risks such as pandemics, macroeconomic factors (e.g. inflation), currency fluctuations, or environmental factors (e.g. climate change, volcanic eruptions or river heights). Other commercial trading risks like fines or penalties, movement restrictions, or labour availability are also often excluded from cover, as are non-damage supply chain risks like fuel shortages.

Table 1: Supply chain risks

Risk grouping	Risk Category	Risk Description
Demand risk	(Geo)Political	Increase in protectionism impacts supply chain demand e.g. onshoring, trade embargoes, etc
Demand risk	Economic	Loss of a key customer and/or supplier (e.g. payment default, customer business model failure)
Demand risk	Economic	Termination of contracts
Operational risk	(Geo)Political	Political instability e.g. Middle East and other strategic chokepoints disrupts supply chain routes
Operational risk	(Geo)Political	Fleet utilisation does not achieve required efficiency levels
Operational risk	(Geo)Political	Changing trade patterns caused by: war, expropriation, Brexit, trade embargoes/sanctions/restrictions, greyzone aggression, negatively affect supply chain functionality or a systemic supply chain
Operational risk	Economic	Failure to forecast future demand effectively results in supply chain delay (e.g. E-commerce growth resulting in increased pressure for faster and cheaper delivery methods)
Operational risk	Economic	Failure of critical national infrastructure (e.g. due to terrorism, fire, flood, etc) results in interruption to critical service/supply
Operational risk	Economic	Disruption to, or failure of, transport and logistics infrastructure can lead to an increased Accumulation Risk as stocks, equipment etc get delayed, destroyed, damaged etc
Operational risk	Economic	Fleet transition risk (e.g. growing vehicle complexity/increased repair costs, transition to alternative fuels is delayed/too costly, inability to keep up with industry appetite for new modes of transportation and sustainability)
Operational risk	Economic	Loss/damage in transit (e.g. raw materials, including temperature-controlled)
Operational risk	Economic	Global economic downturn (e.g. global recession and sharp decline in demand, Inability to access credit due to excessive interest rates)
Operational risk	Economic	Price volatility e.g. raw material or inputs, such as leap in container costs during pandemic, disproportionate rise in transport costs due to changing business model in transport industry
Operational risk	Economic	Currency volatility or fluctuation
Operational risk	Economic	Energy shortages/disruption (e.g. utility failure/disruption)

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Risk grouping	Risk Category	Risk Description
Operational risk	Economic	Fuel shortage prevents transportation upstream or downstream/employee access
Operational risk	Environmental	Epidemic - regionalised or localised (e.g. affects supply continuity/employees/reduces demand)
Operational risk	Environmental	Significant property damage event at own business location (e.g. fire, flood, access to water impaired)
Operational risk	Environmental	Damage to third party premises (e.g. warehouse, charging infrastructure, supplier premises, customer premises, systems disruption)
Operational risk	Environmental	Denial of access/Egress (e.g. major incident in local area, regulatory or otherwise, at own or third party premises, Construction delays at own premises or customer/suppliers)
Operational risk	Environmental	Natural disaster e.g. earthquake, volcanic eruption impact on trade routes/customer good creation/demand
Operational risk	Environmental	Extreme weather e.g. flood, hurricane
Operational risk	Environmental	Drought/water shortage/availability of water impacting transport routes
Operational risk	Environmental	Pandemic - global and systemic (e.g. affects supply continuity/employees/reduces demand)
Operational risk	Environmental	Climate change E.g. negative effect of climate change on supply chain
Operational risk	Legislative/regulatory	Corruption and sanction risks (e.g. confiscation or sanction of goods)
Operational risk	Legislative/regulatory	Third party supply transparency (e.g. one or more suppliers involved in fraud, ethical wrongdoing, such as poor working conditions, child labour exploitation resulting in reputational damage)
Operational risk	Legislative/regulatory	Contractual risks (e.g. fines, litigation costs)
Operational risk	Legislative/regulatory	Government regulation restricts market (e.g. environmental legislation, financial disclosure requirements for suppliers/supply chain)
Operational risk	Legislative/regulatory	Failure to deliver on time e.g bottlenecks or delays at port or warehouse negatively affect supply chain and stock throughput (e.g. COVID-19 delays seen at major transport hubs)
Operational risk	Legislative/regulatory	Closure or restriction of key transport routes (Movement restrictions whether national and transnational, people or goods
Operational risk	Legislative/regulatory	Sustainability
Operational risk	Social	Theft of stock in transit (piracy) or goods from warehouse(s)
Operational risk	Social	Key person (e.g. disruption of supply following loss of key person as a result of critical illness, kidnap)
Operational risk	Social	Labour availability and retention (e.g. drivers/warehouse staff/crew, national and transnational, talent mobility, retention, recruitment, law changes)

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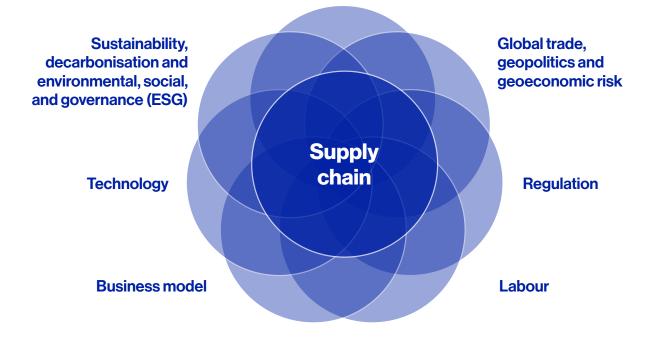
Risk grouping	Risk Category	Risk Description
Operational risk	Social	Unavailability or displacement of key equipment and consequent business interruption (e.g. warehouses, container, fleet, driver, fuel, vessels, Construction delays at own premises or customer/suppliers)
Operational risk	Social	Reputation impact risk (e.g. reduction in quality assurance/product stewardship, lack of action on ESG, failure to respond to supply chain failure)
Operational risk	Social	Failure of employee health and safety results in delays and/or site closure
Operational risk	Technological	Failure of key equipment as a result of technology dependency/failure
Operational risk	Technological	Increasing use of technology in warehouses - Al, robots, technology failure, people risks, unintended consequences
Operational risk	Technological	Critical component industry falls short e.g. semiconductors, affecting Transport and Log operators
Operational risk	Technological	Cyber issues (e.g. Al-enabled cyber attacks, increasing use of technology in transportation supply chain gives new touchpoints for weaponisation of Cyber for physical and virtual attacks, attack on suppliers or logistics parties, data loss, ransomware, denial of service)
Operational risk	Technological	Autonomous vehicles and/or artificial intelligence applications - risk profile changes
Supply Risk	Economic	Failure to successfully implement business strategy and effectively respond to changes (e.g. regulation, technology, transport modes including last mile delivery, market dynamics and customer preferences such as change in business model (JIT to JIC) is unsustainable/too costly, e-commerce growth resulting in increased pressure for faster and cheaper delivery methods)
Supply Risk	Economic	Failure to discharge directors' obligations leads to business disruption and fines (e.g. failure to respond to ESG pressures or mandatory requirements)

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Key drivers that shape the risk landscape

Out of the wide range of risks mentioned, the following are the key supply chain risks and drivers of most concern to the transportation and logistics industry:

Figure 12: Supply chain risks and drivers





Sustainability, decarbonisation and environmental, social, and governance (ESG)

Decarbonisation and environmental, social, and governance (ESG) risks have emerged as crucial factors shaping the landscape of the transportation and logistics industry. The pressing desire to mitigate climate change has led to increased regulations and societal pressure to reduce greenhouse gas emissions. As a result, the industry is experiencing a shift towards cleaner and more sustainable practices, with examples shared ranging from the adoption of electric vehicles, alternative fuels, and efficient logistics operations. This in turn is generating new datasets and tools (see **Box 5**). In addition to their own operations, transport and logistics companies will also be impacted by the transition plans of their customers and the implications that this has on the products they will carry and the routes they will take. Furthermore, ESG considerations encompass broader aspects such as labour practices, human rights, and community impact. Every business model and mode shared a wide range of examples, which have been distributed throughout the report.

- Net zero targets and wider sustainability efforts were highlighted by our interviewees, driven at the company and transport level. For example, the International Maritime Organisation (IMO) has set out a strategy for the industry that targets a 40% reduction in CO₂ emissions by 2030 and a 70% reduction by 2050. It's also stated that the industry should reduce its total greenhouse gas emissions by 50% compared with 2008 levels by the year 2050
- This expanded to wider infrastructure that the industry relies on. For example the C40 Green Ports Forum, a global alliance committed to creating 'green shipping corridors' (initially, between Los Angeles and Shanghai), has tasked those two cities to publish an 'implementation plan' by the end of 2023. In October 2023, the Port of Los Angeles announced it has secured a grant of \$30m from the State of California to support the transformation of the facility into the world's first zero-emissions port80. Similarly, 23 national signatories to the UN's Clydebank Declaration are committed to the creation of at least six green corridors, which it defines as 'zero-emission maritime routes between two or more ports', by the 'middle of this decade'

 For rail, companies are actively developing new low-emission and zero-emission technologies, with several railroads conducting service trials on hydrogen fuel-cell and battery electric locomotives that could significantly reduce greenhouse gas emissions⁸¹

Quotes from interviewed transportation and logistics practitioners

Today trucks account for only 2% of vehicles on the road. Yet they are responsible for 22% of road transport CO₂ emissions in the EU. We cannot meet the Paris agreement without decarbonising road freight.

CEO, Global End-to-end Logistics company

"

We are fully committed to EU GHG emissions reduction targets for 2030 – launching further electrification projects which will triple the length of our electrified railway lines and secure green and economically viable means of transportation for cargo and passengers by 2024.

CEO, Regional Rail company



Through our Net Zero Carbon programme, we have two distinct elements to reach our targets: Being fully carbon neutral in our direct sphere of influence as of 2020 (Scope 1 and 2 of GHG Protocol) and achieving carbon neutrality for our suppliers' and customers' footprint by 2030 – airlines, shipping lines and haulage companies (Scope 3).

CEO, Global End-to-end Logistics company



Box 5: Datasets and tools

If you can't measure, you can't manage. As increasing numbers of companies analyse and report on their greenhouse gas emissions, supply chain emissions have grown in both focus and importance. As insurers consider emissions across whole insurance portfolios, access to this data offers underwriters the ability to share their views during risk conversations with customers. Supply chain-focused coalitions – covering multiple transport modes – are reducing complexity by enabling shippers to participate in decarbonisation efforts. Examples of such collaborative effort already exist and are acceleration opportunities for insurers and insureds:

- Smart Freight Centre (SFC) created the Global Logistics Emissions Council (GLEC) Framework that has been one of the primary inputs for the new ISO 14083 standard (see report 3 for more information). SFC is an international non-profit organisation focused on reducing greenhouse gas emission from freight transportation
- Cargo CO₂ emissions measurement methodology: As shippers, freight forwarders, and their air cargo stakeholders increasingly demand precise flight CO₂ emission information, an accurate and standardised calculation methodology is critical. Adopted in 2014 and updated in 2022, the Recommended Practice 1678 for Cargo CO₂ Emissions Measurement Methodology provides the most accurate calculation results and transparency to everyone interested in understanding the carbon footprint at the shipment level
- The SmartWay program led by the Environmental Protection Agency, aims to track and share fuel use and freight emissions across supply chains. Launched in 2004, it helps companies identify efficient freight carriers, transport modes, equipment, and operational strategies, improving supply chain sustainability and lowering costs. The program supports global energy security, reduces emissions, and is supported by transportation industry associations, environmental groups, state and local governments, international agencies, and the corporate community⁸²
- At the service provider level, IBM is one of many companies heavily investing in surfacing sustainability data relating to transportation supply chains. The company's Envizi ESG suite allows customers to build a data foundation to streamline reporting and disclosures to accelerate an organisation's decarbonisation agenda. With the ability to automatically collect 500 data types from diverse sources, Envizi allows Scope 1, 2, 3 GHG accounting to set and track emissions targeting⁸³. In April 2023, IBM announced a collaboration with the New York Stock Exchange (NYSE) to help support NYSE-listed companies with their larger ESG efforts⁸⁴

Insurance insight:

It is important for underwriters to evaluate the ESG risks of transportation and logistics companies, ensuring they align with responsible business practices and maintain robust risk management strategies to address potential reputational and operational vulnerabilities. The transition to net zero is also associated with several technological, market and legal risks and stakeholders will be questioning how they can best manage, mitigate and finance these. This presents an immediate opportunity for insurers and their brokers to play a role in addressing uncertainty and supporting customer's transition efforts, for example by:

- extending the use of existing bursaries for risk surveys to encourage activities that build understanding of the climate risks and corporate resilience
- leading initiatives to develop insurance products in partnership with industry
- developing initiatives to transfer knowledge, for example, related to risk awareness, assessment strategies and emerging regulation

Technology

Technology risks have become a critical concern for the transportation and logistics industry, shaping its operational landscape. Rapid advancements in technology, such as automation, artificial intelligence, and the Internet of Things (IoT), offer tremendous opportunities for efficiency, connectivity, and innovation. However, they also bring inherent risks. Dependence on complex systems and digital infrastructure makes the industry vulnerable to cyber threats, including data breaches, ransomware attacks, and supply chain disruptions. Additionally, the integration of autonomous vehicles and drones introduces new liability and safety considerations topics that brokers and underwriters in the Lloyd's market are already exploring85. It is also raising questions on the power requirements of new technologies, with concerns that the current grid capacity will not meet the needs of planned upgrades.

- Several companies are equipping freight cars with electronic data interchange with barcodes for offering near real-time response to clients. The technology is anticipated to help companies in exchanging status and orders with their clients and suppliers. These intelligent systems allow companies to reduce inventory and ensure faster replenishment of stocks
- Companies we spoke with were actively integrating technology solutions for transportation and goods tracking through the supply chain, with some building their own systems – this was both a challenge for those further behind on their digital journeys and a huge opportunity to build visibility into their operations
- Cyber threats were repeatedly raised across all conversations with transportations and logistics companies, and the future of the cyber insurance market
- As well as new technology and automation in shipping, ports and terminals are continuing their digitalisation. From the first automated container gate thirty years ago, there are now approximately 40 partially or fully automated terminals around the world. This includes quay cranes, driverless vehicles, drones and automated truck identification. While this example was specific to ports examples were shared across all transport modes and have been mentioned throughout the report

Quotes from interviewed transportation and logistics practitioners

Technology constraints and internal communication due to our company's global footprint make it difficult to track the arrival of shipments which can lead to demurrage or custom's issues.

Global end-to-end Transportation company

"

If a cyber threat exists then the whole system stops and freight wouldn't be able to be moved.

Vice President, Regional Transportation company

"

Our big trucks have 6 cameras and 3 on the smaller goods vehicles, alongside telematics to detect and reward driver behavior.

Head of Compliance, Regional road logistics company

"

The T&L industry suffers from lagging cyber regulations and standards, inadequate cybersecurity awareness and a shortage of cyber defense talent.

Industry Risk Advisor

IVISOI

Insurance insight:

Insurance underwriters and advisors play a vital role in assessing and managing these technology risks. They evaluate the cybersecurity measures and resilience of transportation and logistics companies, providing appropriate coverage for potential losses arising from technology-related incidents, as well as supporting risk mitigation strategies to safeguard critical operations in the digital era.

Business model/physical assets

The transportation and logistics industry faces various business model risks that can significantly impact its sustainability and profitability. Disruptions caused by emerging technologies, such as the rise of autonomous vehicles or the advent of on-demand delivery services, pose both opportunities and challenges for incumbents. Traditional transportation and logistics companies may face the risk of being outpaced or rendered obsolete if they fail to adapt to changing market dynamics and embrace innovative business models. Additionally, the industry is susceptible to competitive pressures, market consolidation, and shifts in customer preferences.

Responding to storage and transporter shortages, companies are buying their own warehouses, cargo containers or even cargo vessels⁸⁶. Examples of business model changes include:

- Increasing capacity: In February 2023, Yusen Logistics started the construction of warehouse expansion and the sprinkler system in their Yusen Yen Phong Logistics Center. The facility is strategically located in North Vietnam, at Yen Phong 1 IP, Long Chau, Bac Ninh Province, and is strategically located 25 km from Noi Bai airport. The warehouse space is approximately 14,400m² and consists of general warehouse and bonded warehouse⁸⁷
- Partnering with stakeholders: Amazon Air's expansion is one of the most notable developments in the air-cargo industry in recent years, with a partnership with Cincinnati/Northern Kentucky International Airport at the centre of an expanding hub network. An estimated \$1.5bn investment has seen the development of an 800,000ft2 facility to support their growing air cargo network⁸⁸. Industry research suggests that between March 2020 and March 2023, Amazon Air expanded its fleet from 33 to 91 planes, a 176% increase⁸⁹
- Pefining transportation modes: A research project by the Rail Safety and Standards Board (RSSB) has allowed freight train operators in the UK to safely haul more goods wagons per train than current practices allow, improving their environmental impact and financial efficiency. The research has enabled existing couplers, which connect freight wagons, to safely connect more load although concerns were raised by companies about being fairly compensated for additional load and fuel costs to pull more weight.

Initial finished indicate that a 50-mile journey (each way) with 24 wagons could be increased to 27 with environmental savings of 0.25 tonne CO₂ and annual financial savings of £291,000. A 235-mile journey (each way) with 14 wagons could be increased to 16 wagons with environmental savings of 1.4 tonne CO₂ and annual financial savings worth £245,000⁹⁰

Quotes from interviewed transportation and logistics practitioners and industry commentary

We've noticed that large companies are shifting their production closer to Europe's borders, showing a preference for the Middle East over Asia. I've identified nearshoring as a clear trend in the logistics industry as a result of the coronavirus pandemic.

Board Member, European Rail Cargo



This hub (at CVG) is going to let U.S. get packages to customers faster.
That's a big deal. We're going to move
Prime from two-day to one-day, and this hub is a big part of that.

Jeff Bezos, Founder and CEO, Amazon

Publicly available quote

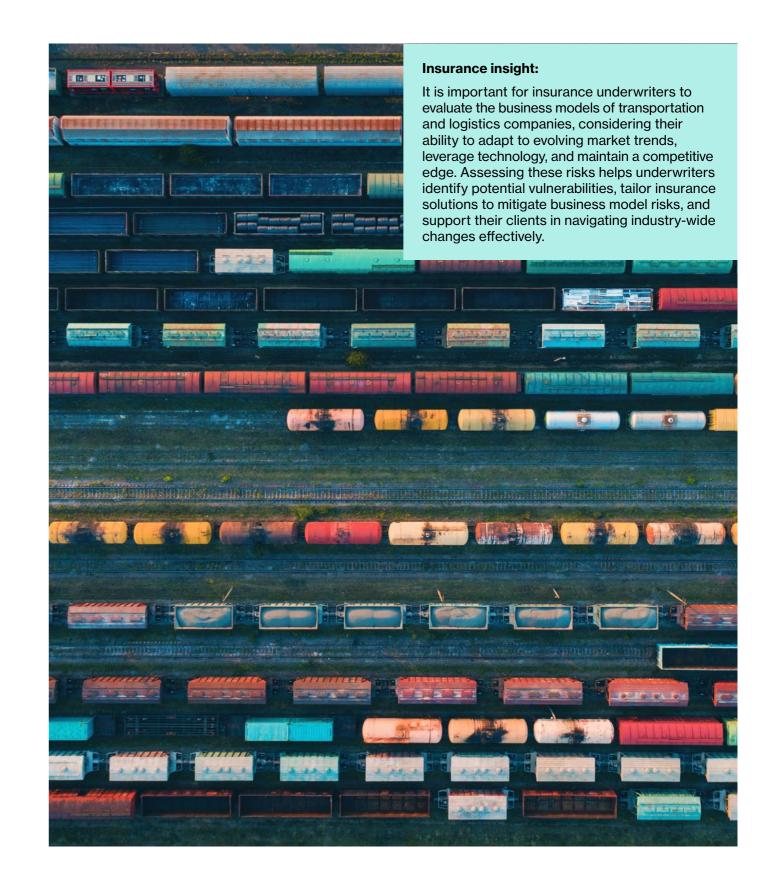


"

We're acquiring more businesses and moving our own freight intermodally with our own drivers.

Director, Global end-to-end Transportation company





Labour

Labour risks play a significant role in shaping the dynamics of the transportation and logistics industry. Workforce-related challenges such as labour shortages, wage pressures, and regulatory compliance issues can impact operational efficiency and increase costs. The industry heavily relies on a diverse workforce comprising truck drivers, warehouse personnel, and logistics professionals. Factors like driver shortages, high turnover rates, and a lack of skilled workers can disrupt supply chains, lead to delays, and affect service levels. Compliance with labour laws and regulations, including those related to working hours, safety standards, and employee classification, is critical to mitigating legal and reputational risks.

The transportation and logistics industry faces particular challenges in attracting and retaining a stable workforce. Sociocultural changes, mobile work nature, and physical working conditions are challenging the appeal of careers in this industry. As businesses adopt new technology and adapt their operations, there is a need to attract and reskill talented individuals.

- Driver planning has become increasingly crucial in the road haulage business, particularly for expansion and truck-related investments, as driver shortages have reached critical levels in several European countries. The UK, in particular, experienced a significant loss of Eastern European truckers following Brexit, resulting in supply chain delays. This shortage of truckers has become a long-term issue affecting investments
- Class 1 railroads, for example, in the U.S. have been taking measures such as storing locomotives, reducing rail car numbers, furloughing crews, and laying off support staff in recent years. They have also lengthened trains to cut costs and improve operating margins
- Labour shortages have affected many of the world's largest ports, causing them to operate beyond capacity for extended periods. To avoid potential labour disputes that have previously stranded goods on docks or ships, companies and customers redirected cargo away from West Coast ports in the lead up to the expiration of the contract covering 22,000 dockworkers in July 2022. Negotiations between the International Longshore and Warehouse Union and the Pacific Maritime Association stalled, leading to sporadic strikes at 29 U.S. West Coast ports⁹¹

Quotes from interviewed transportation and logistics practitioners and industry commentary

There's also a shortage of staff to operate national air traffic and air navigation service systems to increase system capacity.

Head of Risk, Global Air transportation company

"

(Fleet) Dealerships also have shortages of labour. Parts availability and costs are also going up.

Head of Compliance, Regional Transportation Company

"

Our research demonstrates the undeniable fact that low salaries, unattractive or inflexible working conditions and a general lack of respect for these critical jobs is having a catastrophic impact on the ability of employers to fill these roles⁹².

CEO, City & Guilds

"

The COVID-19 lockdowns put a great many pilots out of work, and many young pilots found other jobs/careers and many senior pilots retired early.

Director, Global Aviation & Space

"

Insurance insight:

As labour risks grow, underwriters will likely seek to assess the labour risks of transportation and logistics companies, ensuring they have robust risk management strategies, adequate training programs, and appropriate insurance coverage to address potential liabilities and safeguard against workforce-related disruptions.

Global trade, geopolitics and geoeconomic risk

and logistics practitioners

Geopolitical risks have a significant impact on the transportation and logistics industry. Ongoing trade tensions, political instability, and regional conflicts were mentioned as sources of supply chain disruptions, increased transportation costs, and operational uncertainties. Factors such as trade policy changes such as foreign direct investment (FDI), sanctions, terrorism, and natural disasters pose operational challenges to the movement of goods across borders. Additionally, geopolitical events were repeatedly mentioned as sources of regulatory changes, border closures, and delays in customs procedures, further complicating the logistics landscape. Other concerns raised by interviewees included:

- Fluctuations in global and regional economies, changes in consumer demand, and trade disruptions were also mentioned as drivers of volatile market conditions
- Economic downturns and the threat of reduced shipping volumes, decreased consumer spending, and tighter profit margins for transportation and logistics companies
- Currency exchange rate fluctuations, inflationary pressures, and interest rate changes and their impact on operational costs, financing arrangements, and profitability

Drivers of many nationalities were caught up in the crisis. As one example, at least 600 Turkish truck drivers were stuck in Ukraine when Black Sea ports were locked.

Public Affairs Advisor, Global Transportation Union

Between 1949 and 2019, 88% of sanctions programs worldwide targeted small economies. Today, that figure has flipped: nearly 90% of sanctions designations and export controls target major world economies, especially Russia and China.

Director of Political Risk Analytics, WTW

Restriction of Russian airspace, means everyone is flying through a narrow corridor. There is an issue of East/West transport.

Senior Insurance Manager, major airline operator

,,

Insurance insight:

Identifying and assessing geopolitical risks and developing comprehensive mitigation solutions to protect businesses from potential losses caused by geopolitical disruptions in the transportation and logistics sector will become increasingly important in the future. Carrying out a careful assessment of the economic risks faced by clients, considering factors such as market trends, economic indicators, and industry forecasts is increasingly important. By understanding these risks, underwriters would be better positioned to offer tailored insurance solutions that provide financial protection and mitigate the potential adverse effects of economic uncertainties on transportation and logistics businesses.

Regulatory

Regulatory risks have a significant impact on the transportation and logistics industry, influencing its operations, compliance requirements, and overall risk landscape. The industry operates in a complex regulatory environment, with regulations spanning areas such as safety, environmental standards, labour practices, trade compliance, and customs regulations. Changes in regulations, including new legislation, trade agreements, or shifts in government policies, can introduce uncertainties and compliance challenges. Non-compliance with these regulations can lead to legal liabilities, financial penalties, and reputational damage.

- The requirement to comply with a wide variety of different regulatory authorities was mentioned by every company we spoke to. Everything from truck driver's working hours, increasing sustainability evidence, customs and trade data to fuel tax reporting is often managed manually, an expensive task often lacking in time efficiency
- Specific examples highlighted in our interviews included the recent announcement from the UK government outlining the increased weight limit of Heavy Goods Vehicles (HGVs) to support the transition to alternatively fuelled and zero emission vehicles (ZEVs), which is raising the question of whether an increase in maximum axle weights will be considered to compensate for loss of payload.
 U.S. based companies were also concerned with similar initiatives and whether they would be compensated for carrying additional loads
- Other regulatory and compliance concerns include: concern the EU is overly focused on regulation vs China/U.S., the need for standards to alleviate components and material shortages, growing regulatory costs, and concerns regulators were too slow to act with the industry needing to self-regulate on emerging issues

Quotes from interviewed transportation and logistics practitioners

One of the key messages we heard at a recent Transportation forum was that there was too much industry regulation, generally at an additional cost to operators.

Transportation industry leader, WTW

We have internal departments taking care of financial capacity of suppliers and their level of compliance related to ESG, on an ongoing basis.

LATAM warehousing and port company

Brexit added hidden delays and massive cost to the business.

Head of Primary Logistics, international drinks distributor

Regulatory issues remain an issue for the transportation and logistics fields... large complex customs claims are common and issues related to sanctions are often problematic.

Transportation Risk and Claims expert, WTW

"

"

Insurance insight:

Insurance underwriters play a critical role in assessing the regulatory risks faced by transportation and logistics companies, ensuring their clients have appropriate risk management measures, compliance protocols, and insurance coverage in place. By staying updated on regulatory developments and working closely with clients, underwriters can help mitigate regulatory risks and protect businesses from potential adverse consequences.

As well as the shorter-term risks and drivers facing businesses now, there are four key areas where change is expected to increase over the long term:

Figure 13: A forward look at drivers, trends and risks

1. Sustainability

- Transportation and logistics companies expect sustainability, decarbonisation and ESG to be a major driver and are setting forward looking targets
- Achieving sustainable transportation will require acceleration of new technologies, regulation, and financial investment at a speed – the future risk landscape is being actioned now
- As well as delivering their own net zero carbon strategies, leading transportation and logistics companies are promoting these efforts to help their customers to also achieve their net zero ambitions

2. Business model

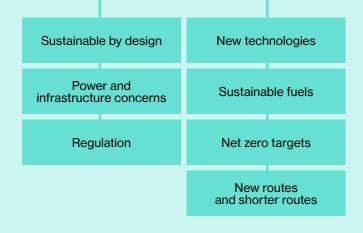
- The transportation and logistics industry is increasingly focussed on a digital first approach, and building better collaboration and co-operation between different modes of transport
- Companies of different profiles are also competing and new players are acquiring different parts of the value chain and reducing transport diversity/options
 this is building resilience in some supply chains and creating new aggregation points in others (e.g. 60% of one supply chain is owned by one company)
- The ongoing talent shortage for drivers/pilots/ warehousing staff will be meeting the talent war all sectors will be facing for digitally savvy talent
- Delivering on 'Purpose' and growing sustainably will be increasingly important as key performance indicators.
 Attention to this aspect of 'performance' will increase

3. Technology

- The transportation and logistics industry will continue to see increased use of robotics, automation, customer -corporate integration, and digital transformation across the entire value chain
- The shape and rollout of technological innovations will impact business models, consumer preferences, products, services, and corporate structures
- Broader and more coordinated utilisation of digital technology in the multimodal transport ecosystem will result in greater efficiency gains, more resilient supply chains, smoother data interchanges, and better safety for delivery mechanisms due to autonomous vehicles
- The continued growth of e-commerce is reshaping corporate investments and driving M&A aimed at acquiring critical supply chain mapping and modelling companies to gain greater visibility into supply chains for enhanced understanding of risks in Tier 1, 2, 3 suppliers

4. Global trade and consumer demand

- The rapid growth of online commerce, has led to an increase in demand for faster and more efficient delivery of goods. Transportation and logistics companies are responding to huge demand and shifting global trade patterns
- Global economic uncertainty may negatively impact crucial infrastructure investment needed in the transportation and logistics industry by slowing growth potential
- Growing nearshoring initiatives is expected to re-chart global supply chains, with large emerging markets like India, Vietnam, Thailand, Indonesia and Mexico expected to benefit
- There will be opportunities for transportation and logistics companies to recreate B2C outcomes for B2B commerce. Consumers will demand greater clarity on purchases in-transit and be willing to pay a premium for instant deliveries



"While there is no silver bullet, or one size fits all solution for aircraft manufacturers, airlines and airports to get to net zero within the next 10 years, the time for planning is disappearing."

Charlotte Dubec, ESG Lead Global Aviation & Space, WTW

M&A activity	Digital first
Smart tracking	Reshoring implications
Skills shortage and future jobs	Competition and new alliances

"By 2050, the outbound and inbound ports have become more like airports in the sophistication and speed with which they anticipate, prepare for, handle and dispatch containers."

Jan-Olaf Probst, Business Director Container Ships, DNV

Intelligent transportation systems (ITS)

Trade-off between data extraction and customer privacy

Digitised supply chain management

Robotics and automation

Omnichannel and Everything as a Service (XaaS) Delivery

"As the use of data collecting devices increases...
the rate of data coming in is far outstripping
the rate of processing, with 463qi (1018) bytes
(or 463bn GB) of data to be produced daily
in 2025."

DHL's Big Data Analytics estimation

Multisourcing and diversification	Reduced customs clearance times
Changing regulations	Circular economy
Future-proofing supply chains	New trade relationships and competition, US-China competition
Increased consumer personalisation	ESG demands from consumers and key stakeholders

"By the year 2027, annual consumption in China is expected to reach \$8.2trn, or nearly twice what it had been just a decade earlier. In India, annual consumer spending is expected to rise even more dramatically, from about \$1.5trn currently to \$6trn by 2030."

World Economic Forum

Source: DNV94 WEF95 DHL96

The future risk landscape: Sustainability

Looking forwards every mode of transportation and logistics has targets they have set themselves and will need to reach their journey milestones (**Figure 14**). To reach their ambitious decarbonisation targets, transportation and logistics companies will require considerable resources, innovation and cooperation – they will also need the support of insurers in understanding the risks and ensuring risk transfer solutions are available. One example is NextGEN, a joint project between Maritime and Port Authority of Singapore and IMO aiming to develop a collaborative global ecosystem of maritime transport decarbonisation initiatives. There are currently 263 projects involving 974 global partners⁹⁷. The International Maritime Organisation's (IMO) decarbonisation efforts have set a clear course to reducing emissions from the global shipping fleet, focus is shifting to ports and terminals where further action is needed.

Early plans in Europe and on the U.S. West Coast suggest billions will have to be spent just to 'electrify' some of the main maritime centres; seen from a global perspective, that signals a significant escalation of financial and business risks across the ports and terminals sector. The European Commission estimates the cost of building the alternative fuels infrastructure (from 2025-2050) at €9.9bn; €2.5bn for hydrogen infrastructure and €7.4bn for offshore power supplies (OPS)⁹⁸. Ports and terminals operators at the maritime complex in San Pedro Bay have been tasked with reducing to zero (by 2030) emissions from their cargo-handling equipment, in line with the 2017 Clean Air Action Plan (CAAP). To date, \$2bn has been spent on cleaner trucks, cargo-handling equipment and initiatives such as OPS, but the ports estimate that the full bill for new technologies, infrastructure and incentive programmes for CAAP strategies could reach \$14bn⁹⁹.

Figure 14: Examples of industry commitments

Sea: The IMO Strategy on the Reduction of Greenhouse Gas Emissions from Ships sets an ambitious goal to reduce GHG emissions from shipping to achieve net zero by 2050; reduce the carbon intensity of international shipping by at least 20% by 2030 and at least 70% by 2040; and work towards phasing out GHG emissions from ships entirely. Medium term measures of the strategy centre on an economics-based element as well as a technical element, including a universal fuel standard which redues the carbon intensity of the industry.

U.S. rail: The Federal Railroad Administration is urging the railroads and rail equipment manufacturers to achieve net-zero greenhouse gas emissions by 2050, according to its new Climate Challenge initiative.

Road: International Road Transport Union's Green Compact is a collective aggreement by the road transport sector to reach net-zero carbon emissions by 2050. To do so, the industry needs to pursue several avenues which are already available but not sufficiently leveraged. A significant uptake of alternatively fuelled vehicles requires a recharging and refuelling infrastructure that is not yet in place.

Air: In 2021 a resolution was passed by IATA member airlines committing them to achieving net-zero carbon emissions from their operations by 2050. This pledge brings air transport in line with the objectives of the Paris Agreement to limit global warming to well below 2°C.

Source: IMO¹⁰⁰ 101, IRU¹⁰², FRA¹⁰³, IATA¹⁰⁴

Every industry is seeing an increased focus on environmental regulations and reporting frameworks, with specific requirements for the transportation and logistics industry that will continue to drive action (see **Figure 15**).

Figure 15: Industry and multimodal sustainability frameworks and reporting initiatives

Task Force on Climate-Related Financial Disclosures (TCFD) For climate-related disclosures, Transportation companies had an average disclosure level of 32%, followed by the Technology & Media industry at 15%. For their Risks and Opportunities, Transportation companies (54% up from 34% in 2019) fared better than Technology & Media (31%), with Food & Beverage companies leading the three industries (61%). The same pattern applies for TCFD's Climate-Related Metrics, Scope 1,2,3 GHG Emissions, and Climate-Related Targets

The Science Based Targets Initiative (SBTi).

SBTi seeks to incentivise as much climate finance as possible from the private sector by scaling up near-term climate finance to achieve net-zero by 2050, and provides companies with clearly-defined, science-based avenues for companies and financial institutions to verifiably reduce their overall GHG emissions in line with the Paris Agreement goals. 5,075 companies have SBTi commitments, including 210 transportation and logistics companies, with 108 of those meeting their approved targets: Air Freight Transportation & Logistics: 56 total companies and 30 companies with approved targets; Highways and Rail tracks: 21/9; Railroads Transportation: 41/23; Trucking Transportation: 73/36; Ports and Services: 7/3; Water Transportation: 12/7

Carbon Disclosure Project (CDP)

CDP is working with transportation companies to catalyse action towards a sustainable and net-zero world, and ranks 18 of the largest publicly listed shipping companies, with three key areas - transition risks, transition opportunities, and climate governance and strategy - appraised with recommendations from the TCFD. In 2022, the CDP assessed that 41% of disclosing companies reported emissions for one or more Scope 3 categories, despite those emissions being 11.4 times higher than operational emissions. For upstream transportation & distribution, 28% of companies had calculated their Scope 3 emissions - and less than 1% of disclosing companies have articulated SBTi-validated net-zero targets

Sustainability
Accounting Standards
Board (SASB, now
IFRS Foundation)

SASB are supporting transportation and logistics companies through industry-based sustainability disclosures about risks and opportunities. SASB's Industry Briefs of the Transportation sector are broken down into Air Freight & Logistics, Marine Transportation, Rail Transportation, and Rail Transportation. Appendix III of each Industry Brief lays out the Sustainability Accounting Metrics for each subsector's Topic, Accounting Metric, Category, Unit of Measure, and Code. Looking forwards, the IFRS Foundation's International Sustainability Standards Board (ISSB) is encouraging companies and investors to continue to use SASB Standards until they are replaced by IFRS Sustainability Disclosure Boards

UNCTAD Framework for Sustainable Freight Transport Framework (UNCTAD SFT Framework) The UNCTAD SFT Framework sets out six steps (diagnosis, visioning, targets, implementation, partnerships and programmes, monitoring and evaluation) to build and strengthen the knowledge, skills, and capacity of relevant freight transport stakeholders interested in advancing a sustainable freight transport agenda. As freight transport makes up between 8 and 11% of global GHG emissions, main tools of the Framework revolve around self-assessment questionnaires, an extensive key performance indicators (KPIs) list, and a catalogue containing over 300 Sustainable Freight Transport Measures (such as California's Sustainable Freight Action Plan aiming to deploy over 100,000 zero emissions freight vehicles, powered by renewable energy by 2030)

Global Logistics Emissions Council (GLEC)

Since its inception in 2014, the principal aim of GLEC has been to develop a universal method for caclulating logistics emissions across, road, rail, sea, inland waterways, and transhipment centres. The GLEC framework is designed to work in conjunction with the GHG Protocol and the CDP - and with the new publication of ISO 14083 in March 2023 - GHG emissions tracking and reduction will result in clearly defined standards and procedures for precise measurement of distances, fossil fuel consumption by vehicle type, and the provision of guidelines for more robust and stringent calculations in an effort to reduce overall GHG emissions. Key partners in the transportation and logistics industry include DHL, Maersk, Hapag-Lloyd, and Kuehne + Nagel

Source: Various¹



The future risk landscape: Business model

Business models are facing two key drivers for change, changes in industry partnerships/the impacts of new players, and the impacts of sustainability in the way they operate. Effective partnerships are the cornerstone of the transportation and logistics industry and over the last 25 years, for example the top 20 marine carriers have almost doubled their market share from 48% to 91%. Operational cooperation between container shipping companies comes in many forms ranging from slot-chartering and vessel-sharing agreements to multi-trade strategic alliances. In early 2023, three alliances were operational globally: 2M (Mediterranean Shipping Co., Maersk), Ocean Alliance (CMA CGM Group, COSCO Group, Evergreen Line), and THE Alliance (Hapag-Lloyd, ONE, Hyundai Merchant Marine, Yang Ming Marine Transport Co.). However, in late January 2023, MSC and Maersk announced they have mutually agreed to discontinue the 2M alliance, set to end in January 2025 and could trigger the start of an industry-wide re-shaping of existing operational agreements, especially on the major East-West trading routes.

As well as shifting partnerships, many of the companies along the value chain are changing in composition. Some of the world's largest retail companies are continuing efforts to secure their own supply chains by acquiring different journey stages and capabilities. This includes road-based companies acquiring rail stock or marine-based companies acquiring airlines¹⁰⁶, who are in turn facing competition from e-commerce companies and other industries looking to bring transportation and logistics in-house¹⁰⁷. Transportation and logistics business models are increasingly edging into the last mile with new technologies, delivery mechanisms, and localised warehousing.



The future risk landscape: Technology

Digital technology has been a critical catalyst of change in the transportation and logistics industry, and that will continue to accelerate in the future. Automation and efficiency gains are driving much of this change as businesses see a strategic imperative in ensuring supply chain resilience and continuity in delivering products to their customers. Projections for the future of the transportation and logistics industry point to the use of technologies currently under development such as drones and autonomous vehicles that lack regulation and legal structures; however, the opportunities are huge. DHL's trends team forecasts that decarbonisation, robotics, big data, supply chain diversification, and alternative energy solutions will have the greatest impact on logistics transformation in the coming decade¹⁰⁸. Other projections include:

- According to PwC's Global Truck Study¹⁰⁹, digitalisation and automation of processes and distribution vehicles will reduce costs in the transportation logistics industry by 47% by 2030
- Smart warehousing and IoT sensors and the effective implementations of new application programming interfaces (APIs) and cloud systems will contribute to greater supply chain visibility and predictability across the entire intermodal value chain as third-party logistics providers (3PLs), freight forwarders, and carriers will seek to meet shifting consumer demands and a reshaping of global trade patterns¹¹⁰
- Boston Consulting Group (BCG) estimates that the global robotics market will climb from \$25bn in 2021 to between \$160bn and \$260bn by 2030, with industrial and logistics robot sales reaching \$80bn¹¹¹

AT A GLANCE: THE LOGISTICS
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Figure 16: Future of logistics roadmap

Source: DHL¹¹²

The future risk landscape: Global trade and consumer demand

The World Trade Organization (WTO) Director-General Ngozi Okonjo-Iweala has described the current and future trends of greater economic integration that is taking place in some areas alongside the fracturing of the global economy in others as 'Reglobalisation'113. When China joined the WTO in 2001, it accounted for 3.9% of global GDP in current dollar terms, compared to 31.3% for the U.S. By 2022, China's share had risen to 18% of global GDP, compared to 24.7% for the U.S. WTO economists estimate that if the global economy decouples into two self-contained blocs, long-term global GDP could decrease by at least 5% - larger than the damage from the financial crisis in 2008-09.

Trade policy has an important role to play in underpinning the positive aspects of a reglobalised world and in balancing geopolitical competition and cooperation, not just through coordinated efforts to strengthen supplychain resilience, but also in enabling countries worldwide to benefit from the twin transitions to the green and digital economies. Research by Standard Chartered estimates that global trade is predicted to grow by 70% to almost \$30trn by the end of this decade¹¹⁴. Key markets across Asia Pacific, the Middle East, and Africa are expected to define the flow of future global trade, driven by the growing consumption in emerging markets and the increasing attractiveness of these markets as sourcing locations (see Figure 15).

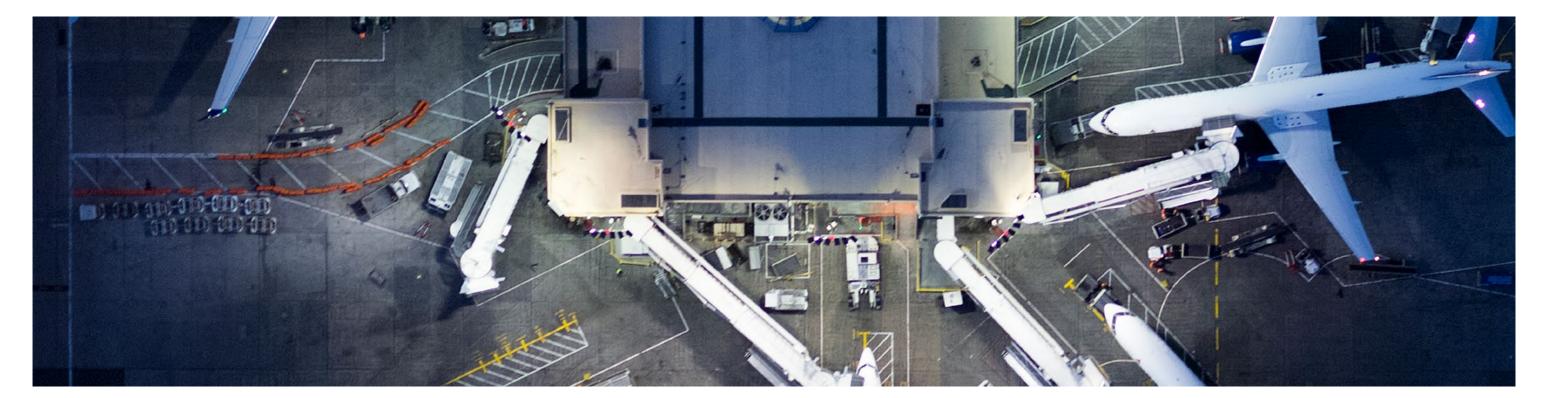
Alongside global trade and reglobalisation, meeting the customer's needs, who are increasingly demanding more and now, is making last-mile delivery ever important and is projected to reach \$90bn by 2030¹¹⁵. At the same time, online marketplaces are anticipated to account for 45% to 50% of online spend by 2025¹¹⁶. The growing demand for the fast delivery of packages by consumers has led to the increased adoption of aerial delivery drones in the global ecommerce industry. While same-day deliveries are at 5% penetration in Europe currently, they are 10% in China and estimated to be 15% in the U.S. by 2025¹¹⁷. Transportation and logistics companies are already responding to these changes with acquisitions and exploring last mile solutions. For example, Maersk has acquired digital fulfilment firm Visible Supply Chain Management LLC, which specialises in parcel delivery, along with a California-based warehouse distribution company, to strengthen its position in the U.S¹¹⁸.

Figure 17: Global trade and key opportunity corridors in 2030

Global Trade in 2030



Source: Standard Chartered¹¹⁹



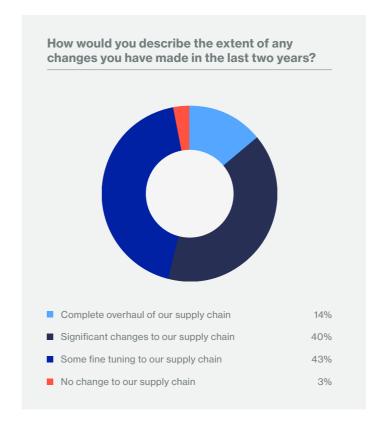
How is the transportation and ogistics industry managing supp chain risk? nd logistics supply chains

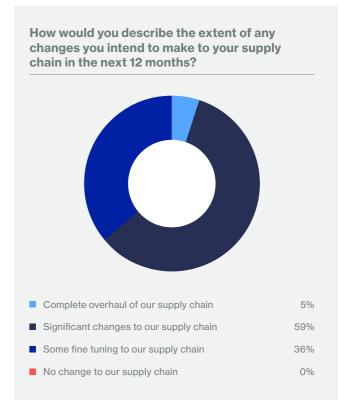
How is the transportation and logistics industry managing supply chain risk?

All transportation and logistics companies take risk very seriously given the impacts of disruption on their ability to keep goods on the move. However there was a range of risk maturity seen across the companies we spoke with – some very advanced in their journeys and others knowing they need to catch up. In addition, the understanding of supplier resilience remains fairly limited and restricted to high level information only and not beyond Tier 2 suppliers.

Examples of recent disruptive incidents include: COVID-19 disruption at Los Angeles Port and Terminal, low water levels in European rivers in 2022, and the freight cargo derailment in Ohio, U.S, in 2023. These events serve as constant reminders of the vulnerability of the transportation and logistics industry to supply chain disruption and the need to improve their resilience. The risk concerns related to these events were reflected in the 2023 WTW Global Supply Chain Survey, where 100 industry risk leaders were asked about the influence of the last two years on how they are responding to risk with management.

Figure 18: Responding to supply chain risks





Source: WTW Global Supply Chain Survey 2023, transportation and logistics companies

The view of supply chain risk from the inside

We asked companies across the transportation and logistics industry to talk to us about their view of supply chain risk and how they are managing it. Views on the biggest supply chain risks varied but five common themes emerged.

Exploring recovery capability: Dealing with disruption, whether it be capacity or routing, is almost business as usual for most supply chain operators. As such they are by their very nature resilient in the way they deal with most operational risks. It is however reasonable to suggest that their recovery capabilities are focused for the most part on operational issues rather than strategic or longer-term risks.

Several companies referenced the existence of a business continuity plan that enable them to respond in a more timely manner in the event of a limited disruption. Examples of how transportation and logistics companies dealt with operation disruption included: diverting shipments to alternative ports, routing, and transport companies (in some cases leveraging partnerships with other transport operators) or exploiting the flexibility offered by some national rail operators such as China Rail services. A major U.S. freight carrier highlighted their prepared 'mode shift' plans that allow them to reroute rail freight to road when needed. Further insights included:

- Larger companies, often those with a global footprint, have well established networks of preferred local suppliers and so are typically less reliant on global chains which mitigates impact
- Electronic data integration (EDI) systems were also mentioned with one company having its own EDI systems which are linked to railroad operators and enables them to monitor network issues such as adverse weather and track disruption in real time. This information is fed to internal teams who are geared up to react and respond accordingly
- In the aviation sector one international commercial airline has entered into pooling arrangements for spare parts for their aircraft fleet. This arrangement, run by a third party mutually funded by the scheme members, allows the carrier to share aircraft parts and warehousing fees at a major UK airport. Staffing expertise along with any airside activities, must go through carrier's training scheme to ensure quality standards

A large retailer with a substantial logistics capability operates a messaging facility on the PDA for en-route disruptions that can be used to communicate with central control facility. In the event of delay customers are advised by text message. Over the last winter when snowfall disrupted roads and viability, customers were all individually called as the retailer was unsure when deliveries could be restarted. This was key to protecting customer relationship management and mitigating reputation risk.

The retailer's business continuity team deal with bigger potential supply chain disruptions.

Risk Manager, UK road-based company

Partnering with third-party companies: Transport and logistics are increasingly looking to third party companies to assist planning and resilience services. One road-based company shared how they had created an in-house product to track shipments for their customers while goods are in transit and are working with outside consultants/technology companies on supply chain and compliance advice. On the aviation side, other partnership models include informing their views on recovery through discussions with manufacturers of aircraft and engines, maintenance providers and specialists, and consultancy companies who are equally invested in the aviation industry and gather knowledge from collaboration.

Examples of other third-party providers across modes and business models included:

- CameraMatics and investigating telematics suppliers, technology providers, insurer and risk advisors, and sustainability consultants
- The use of customs and foreign trade consultancies was also referenced
- Data aggregators to understand their supplier's resilience at pre-contract stage. This also extended to cyber consulting and in both cases, this was part of the effort to understand risks presented at each tier of supplier to then create clarity with insurers

Supplier resilience: Generally speaking, understanding of supplier resilience was limited and restricted to high level information only and not beyond Tier 2 suppliers. However, examples of greater risk maturity included information being collated by procurement teams to form part of the supplier onboarding process, and another interviewee sharing that they internally vet all service suppliers at all levels and ask them to complete a service supplier questionnaire. Where possible, the company additionally try to contractually limit the number of subcontracts to one tier only. They also utilise their own customer sales and relations employees to fully vet customers and ensure where possible that robust contracts in place with their customers.

Unusually, one airline we spoke to reported that the only visibility they have at Tier 2 supplier level is from the press. They try to build relationships via direct communication at conferences or at company updates quoting the example of Boeing which has monthly fleet team calls and gives updates on issues affecting the fleet. Whilst updates are generally minor there are exceptions like airworthiness directives that can lead to aircraft being grounded and impacting the whole aviation eco-system. This same company applies the same principle to supplier vetting i.e., they talk

to Maintenance, Repairs and Operations (MRO) suppliers at conferences and industry events but also use specialist consultants. This approach will be supplemented by acting on recommendations from trusted parties, and the company actively share their experience with their own network of contacts.

Monitoring: Supplier monitoring appeared to be carried out amongst many of the companies we spoke with. Procedures varied by company and included procedures such as measuring performance internally for core suppliers or using third party software for vendors like truckers. Some companies reported stringent monitoring processes including full supplier assessment for insurance and driving licence checks, and SOPs and SLAs in place for bespoke contracts. In one case the company imposed standard requirements including A ratings from a credit ratings company such as S&P or AM Best.

Audit and performance evaluation checks were referenced, supported by periodic meetings with vendors to ensure standard operating procedures were running as prescribed. These controls were normally carried out by internal departments at least annually and in some cases, controls extended to financial capacity of suppliers and their level of compliance related to ESG. The two most common departments leading on monitoring were Procurement and BCM. Interestingly, one respondent reported using a commission-based agent group that is in contact with their customers on an ongoing basis.

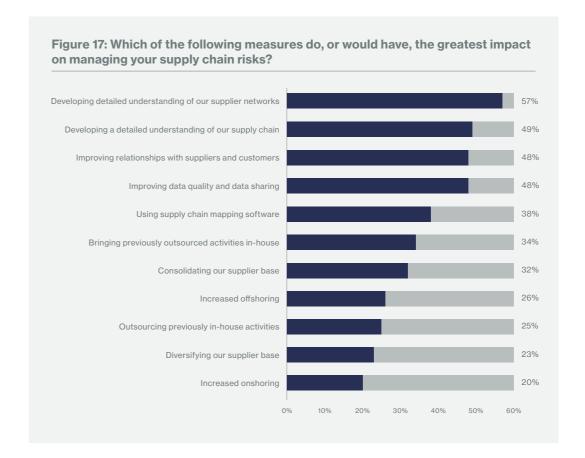
Onboarding new suppliers: Virtually every company we spoke with carry out some form of onboarding in respect of new suppliers. The extent of the process ranged quite significantly. At one end of the scale the onboarding was limited to ensuring the new supplier met minimum standards required, whilst more sophisticated companies would carry out full supplier assessment of insurance, driving licence checks, SOPs, and an SLA in place for bespoke contracts.

One company we spoke to operate a bespoke supplier approval process requiring completion of their questionnaire at onboarding. Ongoing service performance monitoring is carried out via their customer complaints team; late deliveries and cargo damage incidents are investigated and discussed with the service supplier/management and measures put in place to ensure that standards are maintained. Severe or continuous breaches would mean that a service supplier would be removed from their approved supplier program.

In another case the company used a third-party fleet management company e.g., Novuna, VMS, Zenith to manage fleets and suppliers. Contract performance was managed through regular meetings by with the third-party sales manager and dealer network to share details on the resilience they need from them (in person meetings, relationship building). As an example of the effectiveness of this approach, during a severe weather event one group agreed to put on a nightshift to help keep vehicles on the road.

These themes align with the <u>WTW Global Supply</u> <u>Chain Survey 2023</u>, where transportation and logistics companies said:

- Just under half of the companies feel confident that they have the ability to manage root causes of risks to supply chain, and almost three quarters have at least some influence over the quality of supply chain risk management
- Supply chain losses in the last 2 years caught nearly two thirds of businesses by surprise. Around 4 in 10 companies attributed losses to COVID-related issues and the same proportion says they stemmed from earlier problems
- Looking forwards, the lack of suitable supplier alternatives is a major obstacle for 6 in 10 companies who wish to spread the risk or switch away from unsuitable suppliers
- In the absence of supplier choice, better understanding of existing supplier networks and supply chain partners, and relationship building, are seen as key measures to safeguard against supply risks. The second group of measures that are deemed impactful involves technology and data: improving data quality and sharing, and supply mapping software use



Source: WTW Global Supply Chain Survey 2023, transportation and logistics companies



Appendix



Road freight is the transport of goods from one location to another (a place of loading and a place of unloading) by means of motor vehicles via a road network. In road freight, different trucks are used depending on the goods being transported and routes undertaken (e.g. last mile, ultra low emission zoned cities). For many companies, road freight is the most attractive method of having their goods transported, primarily because of its cost efficiency and flexibility – although this relies on a well-developed road network and will vary from country to country.

Road freight dominates primarily in the regional sector with distances of up to 150km and is not dependent on logistical hubs such as ports, airports, or train stations. However, the road network cannot be expanded to an unlimited extent, and roads are at capacity in many metropolitan areas. The costs of maintaining and expanding the road network are also considerable and often borne by the respective state.



Market drivers

The global market for road freight was estimated at \$3.7trn in 2022, and is projected to reach \$5.5trn by 2030, growing at a CAGR of 5%. The largest market is the U.S. and was estimated at \$1trn in 2022 and is responsible for most of the overland freight movement in the U.S., with the sector transporting 3.4bn tonnes per kilometre, amounting to an almost 70% modal share in 2020120. China, the world's second largest economy, is forecast to reach a projected market size of \$1.2trn by 2030 growing at a CAGR of 8.1%. Japan and Canada are each forecast to grow at 2.8% and 4.2%, respectively. Within Europe, Germany is forecast to grow at approximately 3.5% CAGR¹²¹.

Freight volumes are steadily increasing with the growing market share of e-commerce, especially in Europe – this is independent of the pandemic but has been additionally boosted by it. At the same time, there is a lack of personnel challenging the industry: not only truck drivers, but also warehouse operators and other personnel who take care of on-site operations are in short supply. A recent surge in mandatory regulatory compliance combined with a chronic shortage of drivers and high rates of turnover, pushed up freight costs.

Trends

- The functionality of vehicles is being enhanced by digital technology. In addition, digitisation is opening up promising prospects in terms of autonomous driving. For transport logistics, self-driving trucks are an option to meet the challenges of high volumes and staff shortages
- Road freight now accounts for 53% of CO₂ emissions within global trade-related transport, and this share is expected to rise to 56% by 2050 if current trends continue¹²². While many recent technological advances have put a low-carbon-truck future within reach, success will require greater collaboration along the entire value chain
- According to research by the International Energy Agency, in 2021 several other countries announced support for heavy truck electrification¹²³. Electric trucks accounted for just 0.3% of global truck sales in 2021, but need to reach 30% in their Net Zero Scenario by 2030. Rapid deployment will be needed to keep pace with government announcements, and further efforts will be needed. Electric trucks have so far only been substantially deployed in China, thanks to strong government support



Example companies:

- Alkom-Trans SIA
- Culina
- **DB** Schenker
- Deutsche Post AG (DHL Group)
- DSV A/S
- First European Logistics Ltd
- Longs of Leeds
- Yusen Logistics UK Ltd
- DPD (UK)
- Knowles Transport Ltd
- Amazon UK Services
- XPO
- GXO
- Magnus Group
- **Davies Turner**
- Freightliner
- **Gondrand Group**
- Ital Logistics Ltd.
- **KLG Europe**
- Kuehne + Nagel, Inc.
- FM Logistics



Rail freight transport is especially efficient for long distances as one driver can move more containers with comparatively fewer rest stops. Rail freight transport is increasingly electrically powered, which avoids fuel surcharges and oil price fluctuations, although diesel remains in many countries. In Europe, around 80% of all freight train kilometres are covered electrically. In the future, when the proportion of green electricity used to power locomotives gradually increases, net zero emissions from freight trains will be possible. At present, rail transport emits less than one-fifth of the greenhouse gases caused by road transport per ton transported and kilometre travelled. However, this is not only due to the drive system, but also to the better ratio of transport volume and necessary operating power.

The rail infrastructure for freight transport is owned by a small number of companies. In Germany, DB Netz is the largest operator, in France, SNCF Réseau, ProRail in the Netherlands, or Network Rail in the UK. Anyone who wants to move goods by rail is dependent on these companies.



Market drivers

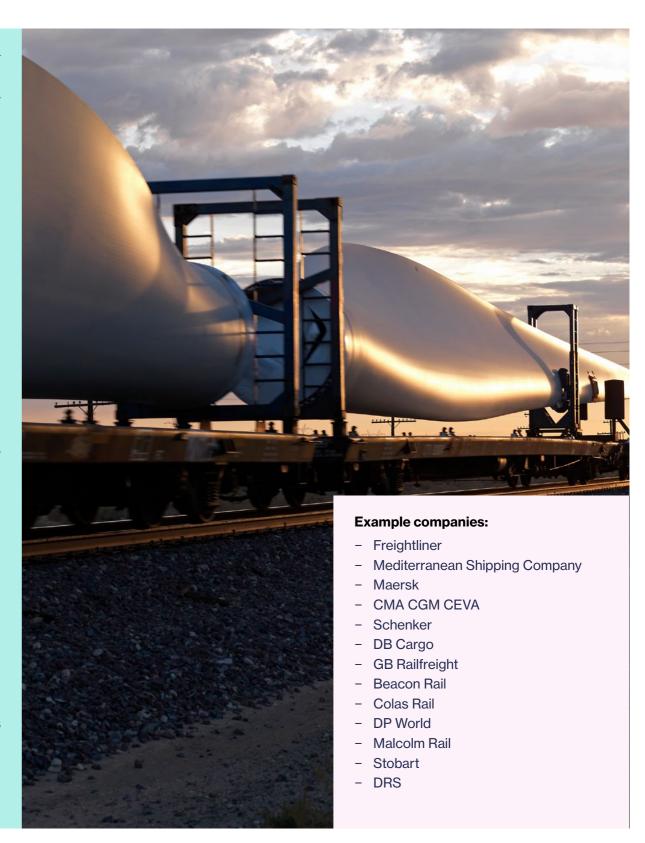
The global market for rail freight was estimated at \$170bn in 2022, and is projected to reach \$205bn by 2026, growing at a CAGR of 4.3%. The market in the U.S. was estimated at \$58bn in 2022, and currently accounts for a 34% share of the global market owing to its extensive network of railways spanning over 200,000 miles¹²⁴. China, the world's second largest economy, is forecast to reach an estimated market size of \$35bn in 2026 growing at a CAGR of 5.5%125.

Among the other noteworthy geographic markets are Japan and Canada, each forecast to grow at 2.8% and 4.1%, respectively. Within Europe, Germany is forecast to grow at approximately 3.3% CAGR while the rest of the European market is anticipated to reach \$35.5bn by the end of 2026. Argentina's strong 38,326km rail track infrastructure and Chile's \$5bn investment in railroad infrastructure are mainly driving rail freight growth in South America¹²⁶.

The world's railway network spans over 1.3m route-kilometres worldwide. The U.S. operates the longest railroad network in the world, closely followed by Russia, China, India, Canada, Germany, and France. The average annual market volume of railway technology in North America is forecasted to reach around \$34bn by 2023, while Western Europe will be the region with the highest market volume¹²⁷.

Trends

- Connecting different transport modes to the rail transport system, the intermodal segment is gaining from various trends including globalisation, growing domestic intermodal transport, increasing focus on containerisation and surge in international transportation
- Emissions, fuel price volatility and high capital cost for wayside electrification impact railways and their customers. Zero-emission or near-zero emission, cost-effective solutions are necessary for rail to remain a viable transportation mode, for expansion, and to competitively and sustainably meet current demand and accommodate growth
- Underdeveloped rail infrastructure is a stumbling block for rail freight. Only as many trains can run as the rail network allows, which can lead to unwanted waiting times. As the infrastructure in many countries is not only limited but also outdated, urgently needed maintenance work on the rail network adds to the expansion measures in many places. The World Bank is one of the largest global funders of new infrastructure funding across emerging economies





Aircraft move well over \$5trn worth of goods by air each year¹²⁸, and the significant growth being projected for this sector, not to mention its role as a critical enabler of trade and prosperity, require that its processes, procedures and the international standards supporting its global effectiveness become better aligned with modern demands and capabilities. International Civil Aviation Organisation (ICAO) is meeting these challenges through programmes aimed at modernising the global air cargo regulatory framework and through new strategic partnerships with key international State and industry agencies¹²⁹.

The main categories of air cargo include dangerous goods, live animals, and humanitarian aid, as well as perishable, temperature-sensitive pharmaceuticals, chemicals, food and ornamental plants.



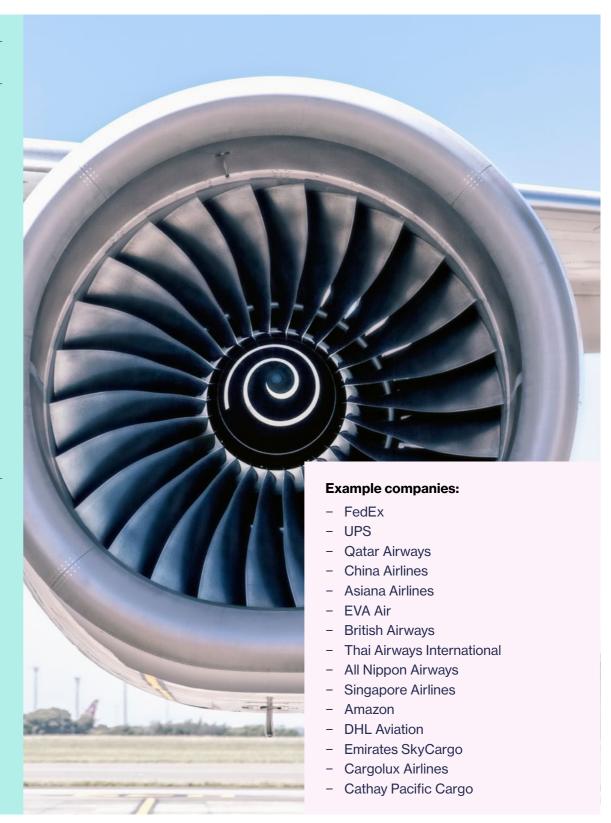
Market drivers

Between 2004 and 2021, worldwide revenue generated in the cargo aviation industry more than doubled, reaching a peak of \$175bn in 2021. However, global airfreight traffic only increased by roughly 62% during the same period. According to U.S. Department of Transportation, Bureau of Transportation Statistics, the top three U.S. airports together handled nearly one-third of the total landed weight of all-cargo operations. Anchorage is a major international gateway for trade with Asia, and Memphis and Louisville are major hubs for FedEx and the United Parcel Service (UPS), respectively. Memphis recorded a substantial increase of 97% between 2000 and 2021. Louisville had an increase of 120%, which is substantial. Cincinnati/Northern Kentucky International Airport (CVG) had an increase of 365%, which is even more substantial, to move into seventh place from nineteenth place. Weight increased by 63% at the top 25 airports and by 47% at all airports.

In addition to well-functioning markets with a multitude of cargo firms, cargo airports are the necessary nodes in the global air freight transportation industry providing crucial infrastructure for air cargo firms. Key airports supporting cargo in 2022 included: Hong Kong (HKG) with 4.2m tonnes (+16% from 2021) remained the top ranked airport followed by Memphis (MEM) with 4.0m tonnes (-9.8%) and Anchorage (ANC) with 3.5m tonnes (-4.3%)¹³⁰. New investments include CVG, which has signed an agreement with Burrell Aviation to invest upwards of \$20m on a new air cargo warehouse that will use next-generation supply chain infrastructure¹³¹.

Trends

- The drive for more sustainable fuels, aircraft, and infrastructure is increasingly becoming a key battleground with key decisions needing to be made on the future of flight. This includes the need to consider air traffic control and airspace agreements, new regulation, new technology and infrastructure, and the potential for space ports
- In the short term, air cargo volumes are estimated to have decreased by 6.7% year-over-year (-1.7% versus 2019), to close to 117m metric tonnes in 2022. Air cargo volumes in the top 10 airports for air cargo traffic representing around 27% (30.8m tonnes) of the global volumes in 2022 - lost 9.9% in 2022 year-over-year (but kept a gain of 4.1% versus 2019 results) The decline is be attributed to the ongoing geopolitical tensions and disruptions to global trade and supply chains¹³²
- Changing business models and future growth as consumer demand and supply chain dependency demands delivery now. In less than a decade, Emirates Group's air cargo volume increased by 70%, reaching over 2.6m metric tons of cargo carried¹³³





Container ships have grown over recent decades due to a continuous search for economies of scale by shipping lines. Two thirds of global container throughput is being handled in ports in emerging and frontier markets, driven by inbound cargo that will likely continue to grow as populations in the Philippines, Bangladesh, Tanzania, and Egypt increase. Other growth markets include Turkey and Mexico as other countries expand nearshoring.

All high-volume ports are directly connected to the road and rail system or have nearby road and rail facilities. On-dock rail transfer facilities place containers directly on trains, thereby reducing the number of truck and rail drayage trips. Most container terminals have either on-dock transfer facilities within the terminal boundaries or off-dock facilities nearby. The number and size of cranes affect the number and size of ships a terminal can handle, which in turn indicate terminal capacity. The busiest container ports also have the most container cranes. The Port of Long Beach had the greatest number of container cranes (72). followed by the Port of Los Angeles (67) and the Port of New York & New Jersey (59)¹³⁴.



Market drivers

The global cargo shipping market size was valued at \$2.2trn in 2021, and is projected to reach \$4.2trn by 2031, growing at a CAGR of 7%135. The market is dominated by Asia-Pacific followed by Europe, North America, and LAMEA (Latin America, Middle East, and Africa). Asia-Pacific is expected to maintain its dominance in the global market, particularly in China, South Korea, and Japan due to some distinct advantages, such as an increasing number of favourable trade agreements, China's huge population in the country and the presence of a large manufacturing base.

International maritime trade flows, which had declined in 2020 by 3.8%, bounced back in 2021 with 3.2% growth, to a total of 11.0bn tonnes - only slightly below pre-pandemic levels. The recovery was supported by an easing in the pandemic, with corresponding overall improving economic conditions and increased consumer spending¹³⁶. The maritime seascape is also being transformed by demands for more resilience and sustainability and the need to decarbonise. On 1 January 2023, three new IMO regulations came into force – aiming to reduce maritime greenhouse gas emissions and the environmental impact of ships.

Vertical integration of intermodal transport is picking up pace as operators look to increase efficiency, decrease costs, and improve control throughout the supply chain. This includes investment in 'dry ports' - secure in-land storage for handling, storage, inspection. Recent acquisitions include LF Logistics by Maersk, and the takeover by PSA of three inland container terminals in Riyadh and Dammam in the Kingdom of Saudi Arabia¹³⁷. Although delays have improved and dry cargo rates are coming down, maritime transport remains vulnerable. Ports, shipping companies and transport operators need to expand capacity, renew and expand fleets and equipment, ensure adequate and skilled labour, improve connectivity and performance, reduce emissions and safeguard competition to build resilience.

Trends

- According to UNCTAD (United Nations Conference on Trade and Development), international maritime trade is driven in particular by growth in containerised, dry bulk, and gas cargos. However, uncertainties like geopolitical tensions and global pandemics like COVID-19 remain an overriding theme in the current maritime transport environment, with risks tilted to the downside
- As with aviation, new environmental requirements are impacting ship design (new fuels, powerplants, etc) that may be reaching an inflection point that could impact alliance structures and business models. Many of the new ships on order are over 23,000 TEUs as ship owners continue economies of scale despite low scrappage rates. In early 2023, MSC operated a fleet (owned and chartered) of about 4.7m TEU, with an order book of an additional
- Rising demand for high-performance computing products for many industries, including cars and other transportation solutions, is creating supply challenges with shortages expected to continue for the foreseeable future. UNCTAD projects global maritime trade will lose steam, with growth slowing to 1.4% in 2022. For the period 2023-2027, it is expected to grow at 2.1% annually – slower than the 3.3% average recorded during the past three decades¹³⁹



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