Photo by Rachael Rinchiuso
Kearney, Chicago

The great reset

CSCMP'S ANNUAL

STATE OF LOGISTICS REPORT®

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Introduction

Welcome to the 34th Annual Council of Supply Chain Management Professionals (CSCMP) *State of Logistics Report*. As we considered titles for this year's report, one suggestion was *The revenge of the shipper*, as it reflected the mood in the market.

After two years in which carriers made fortunes from the scarcities and bottlenecks of the pandemic era—while shippers fumed at ongoing cargo delays and cost overruns—the proverbial shoe is now very much on the other foot.

In 2022, the market swung back sharply in shippers' favor, a trend that has largely continued during the first half of 2023. Across all modes of transit, shipper demand and carrier capacity have rebalanced. Inventories are ample, and the quirky demand spikes of the quarantine era have leveled off for now.

Many shippers still feel stung by the supply disruptions of 2020 and 2021, and by what they regard (in some cases quite fairly) as carriers' excessive willingness to bend or break prior logistical agreements, and to sell their capacity at high premiums.

So now shippers—a vast category that includes manufacturers, retailers, and any other enterprises that send or receive goods in meaningful quantity—are looking to take advantage. They are in many cases rethinking their former trust in long-term carrier agreements, and more aggressively seeking options for capacity assurance.

The annual bid, which has traditionally given both shippers and carriers a base of certainty for capacity and rates, has in many cases been recast as just another component of how shippers engage with carriers, third-party logistics providers (3PLs), and forwarders, rather than the definitive last word. Mini-bids and more frequent touch points are becoming the norm as shippers look for closer market engagement.

So, where does all this leave carriers? There's no denying that most freight haulers are indeed in a tight spot, with profits beginning to decline substantially. In addition to the broader market dynamics sketched out above, many carriers face increasingly difficult labor issues—a topic sufficiently important that we've dedicated a whole section to it in this year's report.

One avenue is for carriers to more actively seek out the role of true strategic partner to shippers, doubling down on such qualities as reliability, visibility, and comprehensiveness of service. As we see in the 3PL section, some especially powerful carriers are looking to do this by offering turnkey "4PL" capabilities.

But as important as the changing shipper–carrier dynamic may be, we don't think it tells quite the whole story. There's a deeper development that involves shippers and carriers alike—and suggests they may have more common ground than either realizes.

That development is the major shift in the role of logistics itself across the entire economy. Before the pandemic, logistics was still largely considered a side function. Now, however, it's widely seen as a core determinant of service and revenue outcomes, and a strategic differentiator.

To fully understand this increasingly vital industry, it is necessary to assess the macroeconomic situation, and to look in some detail at its major subsectors—from warehousing to air freight to last-mile delivery, and everything in between.

That's the purpose of the *State of Logistics Report* every year, and this 34th edition seeks to advance that understanding (and capture the rapidly changing nature of logistics itself) by adding a few new sections.

This edition debuts a section on logistical networks, in recognition of the ever more interconnected nature of supply chains. We also added a new section on the logistics labor market, which has been a powerful influence on industry outcomes over the past year and a half.

Throughout all sections of this report, we rely on data and insights from a wide range of sources. These include United States business logistics costs (USBLC) figures, as well as quantitative and qualitative findings from CSCMP, Kearney, and such industry partners as Penske Logistics, LaserShip, Federal Reserve Bank of Cleveland, The Coca-Cola Company, Leaf Logistics, Kodiak Robotics, Morgan Stanley, and many others.

It's becoming increasingly clear that shippers and carriers are unified by a need to think more seriously and proactively about building strategic capability.

To all of these partners, we offer our thanks. To you, our readers, we offer our hopes that you will find this report both informative and thought-provoking—and that you will let us know if you have any questions, comments, or suggestions for future improvements.

Finally, a word on a theme that captures many of the insights that you'll find in the upcoming sections.

It's becoming increasingly clear that shippers and carriers are unified by a need to think more seriously and proactively about building strategic capability—to not rely so heavily on temporary market stability, and to instead focus on building the agility to respond effectively to whatever disruption erupts.

Such strategic agility cannot be achieved overnight. It takes planning and resources. It takes top-level executive commitment and across-the-board organizational buy-in. It takes money. It also takes time.

And the time to begin is now. This may be hard to perceive for shippers, who have the wind strongly at their back. But if the past few years have taught us anything, it is that uncertainty is now a near constant in the global economy, and that the smartest way to respond to good times is to gather resources for when conditions suddenly shift once again.

For carriers, the challenge is the narrowness of focus that can arise when profits are hard to come by, and where making it through the quarter is the top priority. At such a moment, thinking expansively and strategically can feel like a luxury—but in truth, it may be a necessity, and the surest path back to prosperity.

In short, then, this time should be less about either side getting revenge and more about both sides getting reset—resetting their thinking, resetting their strategies, perhaps even resetting their trust in one another.

Welcome, then, to the 2023 *State of Logistics Report*. Welcome to *the great reset*.

Executive summary

Resetting for a transformed supply network

The overarching theme of last year's *State of Logistics Report* was that supply chains were fundamentally "out of sync" as a result of disruptions related to COVID-19. While the pandemic is still not fully behind us—and may be with us in some form or another for several years to come—it is no longer closing shops or congesting seaports.

To a large degree, then, the period studied by this year's report—the calendar year of 2022 and the early months of 2023—has been about getting back "in sync." As touched on in the introduction, it has more fundamentally been about the resetting of relationships, assumptions, and practices for a world transforming. A central feature of this transformation is a shift among logistics executives from strictly transactional perspectives to a more strategic and holistic sense of their function's role.

"Concessions that were given during the pandemic are getting clawed back."

Marc Althen, Penske

The transformations rippling through the logistics sector are the result of rapid evolutions in delivery requirements and consumer expectations just as old assumptions about supply chain stability are being disrupted. As e-commerce and direct-to-consumer sales have grown, order fulfillment has become increasingly complex, fragmented, and vulnerable. The deceleration in e-commerce growth should give shippers and carriers some room to build strategic plans until other causes of complexity arise.

Nor is this the full extent of the transformations confronting the industry. Geopolitical disruptions, increasingly potent cyberattacks, and an intensifying cycle of climate-related natural disasters are all placing trade and distribution networks under increasing stress—at precisely the moment when those networks are becoming more essential to companies' bottom lines.

The transformations rippling through the logistics sector are the result of rapid evolutions in delivery requirements and consumer expectations.

That's why thoughtful executives are seizing this moment for a *great reset*—a revisiting of former arrangements, some of them overtaken by recent events, some of them cobbled together rather hastily amid the confusions of the pandemic. It is time to get clear about what is working now, and what is needed to ensure resilience for an uncertain future.

The period covered by this edition of the *State of Logistics Report* covers the next strongest cost growth in the past decade and the highest % of GDP ever, as United States business logistics costs (USBLC) hit $2.3 trillion in 2022, growing 19.6 percent year over year (YoY) and representing 9.1 percent of national GDP (see figure 1).

Coming off this performance, supply chain demand is likely to remain stagnant or even diminish over the remainder of 2023. The reasons for this are varied and are rooted in lingering uncertainties for the global and US economies.

The International Monetary Fund reports that GDP growth in 2022 was a modest 3.1 percent worldwide, and predicts 2.9 percent growth for 2023. For the United States specifically, the picture was a bit brighter in 2022 than many had expected, with growth remaining stable at 2.1 percent as consumer and business activity showed surprising vitality. While there remains a chance for a domestic recession in 2023, any such downturn is likely to be mild and short-lived.

One lingering shadow across the US economy is inflation. While prices are down from the highs of 2022, they remain elevated across many categories, and much will ride on whether monetary policy can bring inflation to heel without compromising overall economic health.

Figure 1
The USBLC increased 19.6% YoY between 2021 and 2022

Overview of 2023 USBLC figures ($ billion)

	2022	2021	2020	YoY 2022/2021	YoY 2022/2020	5-year CAGR
Transportation costs						
Full truckload	403.8	380.4	313.6	6.2%	28.8%	7.9%
Less-than-truckload	96.3	90.6	74.8	6.4%	28.8%	6.9%
Private or dedicated	395.8	373.5	304.5	6.0%	30.0%	8.0%
Motor carriers	896.0	844.5	692.9	6.1%	29.3%	7.8%
Parcel	217.3	207.5	181.0	4.7%	20.1%	13.7%
Carload	64.7	55.0	48.3	17.6%	33.9%	2.3%
Intermodal	34.5	29.4	26.2	17.6%	31.7%	10.5%
Rail	99.2	84.4	74.5	17.6%	33.1%	4.8%
Air freight (includes domestic, import, export, cargo, and express)	66.8	65.7	40.2	1.7%	66.3%	–2.9%
Water (includes domestic, import, and export)	36.4	30.7	25.7	18.4%	41.8%	1.4%
Pipeline	75.7	63.2	56.3	19.8%	34.4%	10.2%
Subtotal	**1,391.4**	**1,296.0**	**1,070.5**	**7.4%**	**30.0%**	**7.6%**
Inventory carrying costs						
Storage	218.5	185.1	154.1	18.1%	41.8%	9.5%
Financial cost (WACC x total business inventory)	313.0	164.5	123.3	90.2%	153.9%	15.4%
Other (obsolescence, shrinkage, insurance, handling, others)	227.8	149.8	118.9	52.0%	91.6%	12.7%
Subtotal	**759.3**	**499.4**	**396.2**	**52.0%**	**91.6%**	**12.7%**
Other costs						
Carriers' support activities	93.8	78.6	62.4	19.3%	50.3%	10.0%
Shippers' administrative costs	72.3	63.1	57.6	14.6%	25.5%	7.5%
Subtotal	**166.1**	**141.6**	**120.0**	**17.3%**	**38.4%**	**8.9%**
Total US business logistics costs	**2,316.7**	**1,937.0**	**1,586.8**	**19.6%**	**46.0%**	**9.2%**

Notes: The 2017–2022 USBLC figures have been retroactively revised to incorporate two changes this year: (1) the revised methodology for parcel market sizing and (2) an S&P Global data refresh. Due to these changes USBLC percentage of GDP has increased. See the report appendix for further detail on these revisions. Includes 5.4% inflation for 2021 numbers. USBLC is United States business logistics costs. YoY is year over year. WACC is weighted average cost of capital.

Source: CSCMP's 34th annual *State of Logistics Report* (see report appendix)

A primary source of this inflation is also one of the engines of America's persistent growth—a hot labor market, in which unemployment is at or near the lowest levels seen in a half-century. This relative scarcity of willing and able workers has had a particularly forceful impact on the logistics sector—a reality reflected in our decision to devote an entire section of this year's report to the topic.

Beyond such immediate sources of uncertainty there are other factors motivating companies to act now to reset their logistical networks. In recent years, the world has seen a resurgence of forces that threaten longstanding assumptions of ever-expanding global trade—forces such as nationalism, protectionism, and even major-power conflict.

For many businesses, reshoring now appears to have shifted from a strategic possibility to a market reality. US companies have been increasingly moving supply chains closer to home. American imports of Mexican manufactured goods grew a staggering 26 percent according to Kearney's Reshoring Index.

The war between Russia and Ukraine continues to threaten the stability and prosperity of Europe, while deepening concerns about Chinese intentions have accelerated efforts to redirect manufacturing and sourcing to other nations throughout the Indo-Pacific region and the Americas.

Then there is climate change, which is increasingly influencing the availability of resources and vital infrastructure, as well as the perceptions and expectations of consumers. Companies are increasingly folding sustainability considerations into their business models, and regulators around the world are increasingly requiring that they do so—through a multiplying array of mandates, incentives, and standards.

By now, there are numerous well-proven sustainability strategies that are not only relatively easy to implement, but fit neatly within the logic of the great reset, which emphasizes the virtues of flexibility, efficiency, and resilience—qualities that are only becoming more vital for companies throughout the logistics sector.

A tally of main sectors

Here is a quick survey of how the forces outlined above affected the primary logistics sectors. The articles in this report explore each of these sectors in greater detail.

Air

Worldwide air cargo revenue is projected to reach approximately $150 billion in 2023. This is 25 percent below 2022, when the sector was still profiting from historically high rates, but still 50 percent higher than the pre-COVID revenue figures from 2019. Several factors have pushed rates back to earth, including a falloff in demand, the return of many shippers to waterborne freight, and a surge in capacity as passenger flights resume and new planes come online. East-West air freight rates dropped 23 percent from January to December 2022. One bright spot for the sector: the global average jet fuel price index has declined by about 20 percent since April 2022.

Parcel and last mile

The explosive growth in e-commerce at the height of the pandemic has begun to moderate as shoppers have returned to stores—a development with sizeable implications for parcel companies. Even as the US parcel market has grown to its largest size in history, its percentage of retail sales has begun to flatten. Volumes declined by 2 percent in 2022 but are expected to grow at a 5 percent CAGR over the next five years. Revenues have increased as major deliverers shifted toward a focus on profitability, as seen in recent rate hikes. One especially vibrant slice of the parcel and last-mile sector is same-day delivery, which is expected to grow from $6.4 billion worldwide in 2022 to $7.9 billion in 2027, rising at a CAGR of 18.8 percent.

Third-party logistics (3PLs)

Third-party logistics firms took on increasingly significant roles as shippers looked for added expertise to navigate the unusual circumstances arising with the COVID pandemic. Increasingly, shippers are calling upon 3PLs for more specific needs, especially data management, visibility, and analytics. But beyond even this, shippers are increasingly open to trusting 3PLs with the stewardship of entire supply chains—as 4PL capability resurges. Freight under management by 4PLs is growing, though there still are not many 3PLs capable of playing at this more demanding level. As a result, the 4PL market is increasingly concentrated among a handful of larger providers.

Freight forwarding

The freight forwarding market is expected to grow from $48 billion in 2021 to $90.7 billion by 2031, a compound annual growth rate (CAGR) of 6.3 percent. This growth derives from the continued expansion of e-commerce, as well as the ongoing pressure on shippers to trim costs and increase the efficiency of their supply chains. Digital freight forwarding is an especially dynamic market; valued at $2.92 billion as of 2020, it is expected to be worth $22.9 billion by 2030, a CAGR of 23.1 percent. The trend within the overall forwarding sector is toward more comprehensive offerings, and therefore toward increased market consolidation—though there are signs the largest shippers may be moving toward more direct relationships with carriers, a move that could deprive forwarders of lucrative potential clients.

Water/ports

Major ocean liners made combined global operating profits of $215 billion in 2022, buoyed by a continuation of high rates from the previous year. That trend lost steam as demand weakened and ship availability returned to something like normal—though an increase in US import volumes in April 2023 may suggest a demand recovery. Following their flush months of 2021 and early 2022, sea carriers face a reckoning: their 2023 profits are projected at $43 billion, an 80 percent year-over-year decline. The first quarter of 2023 saw a return of blank sailings, particularly on routes from Asia. As capacity began to open up again, shippers took advantage by renegotiating agreements and diversifying their options—showing a preference for shorter deals, spot markets, mini-bids, and other arrangements that can help them better weather uncertainty.

Motor

Road freight—which is the largest chunk of logistics spending—saw little change in overall volume, as shippers weighed concerns about inflation, rising interest rates, and overstocked inventories. At the same time, capacity increased, resulting in a sharp decline in spot rates. These changing dynamics have induced shippers—who turned toward dedicated fleets to address the capacity challenges arising during the peak months of the pandemic—to seek a new balance among dedicated, private, and one-way services. Carrier margins were threatened by low rates and high resource costs, with smaller carriers—reliant on the spot market—under particularly acute pressure.

Rail

Class I railroads saw operating income increase by 8 percent year over year, and total revenue by 14 percent—gains largely attributable to price increases. But while rate hikes boosted railroads' income and revenue, rising costs undermined operating ratios. The sector also suffered from service-related issues, including increased terminal dwell, ongoing congestion, network speeds that still lagged pre-pandemic velocity levels, and some high-profile derailments. Aggregate carload volume for Class I carriers was static, though volume levels shifted markedly for some product categories.

Warehousing

As companies raced to meet demand for consumer goods during the pandemic, inventories skyrocketed and demand for warehouse space heated up considerably. In 2022, however, that demand waned, resulting in overstock. Warehouse vacancy rates fell sharply, to as low as 2.9 percent—down 41 percent from the 4.9 percent high of 2021, and well below pre-pandemic levels, which tended to hover around 6.5 percent. These historically low vacancy rates resulted in higher rents, though this rise was mitigated by robust construction of additional warehousing space. Even as available space is increasing, companies are hesitating to occupy it as they try to get rid of excess inventory and use existing space more efficiently. Net absorption peaked in the second quarter of 2022 but then decreased nearly 20 percent by the fourth quarter. The pricing and availability is expected to be more favorable for shippers in 2023.

Reset and resilience: preparing for whatever's next

What's clear from these sector summaries—and from the articles that follow—is that the age of building supply chains just around cost-reduction considerations is over. A new value has taken center stage: resilience.

But the best ways to achieve resilience are not always obvious. They often involve trade-offs among core priorities, such as speed, service, optionality, and savings. These calculations are only becoming more complex and nuanced with time.

To cite just one example, increasing fragmentation of demand means that massive distribution center footprints are becoming less profitable. Yet shippers often need a large footprint to maintain high levels of service and ensure supply resilience.

Logistics leaders are responding by taking a more holistic and comprehensive view of their value chains. They are diversifying their sourcing to avoid overreliance and to ensure ample workarounds in the case of sudden disruption. They are investing in technologies and human capabilities to enhance organizational awareness of what's happening across the entire network. And they are actively resetting their supplier and carrier commitments, their approaches to customer service, and their expectations of what lies ahead.

Because if the past few years have been any guide, it is wise to make discretionary resets when one can—rather than be compelled to improvise them when one must.

The age of building supply chains just around cost-reduction considerations is over. A new value has taken center stage: resilience.

Macroeconomic

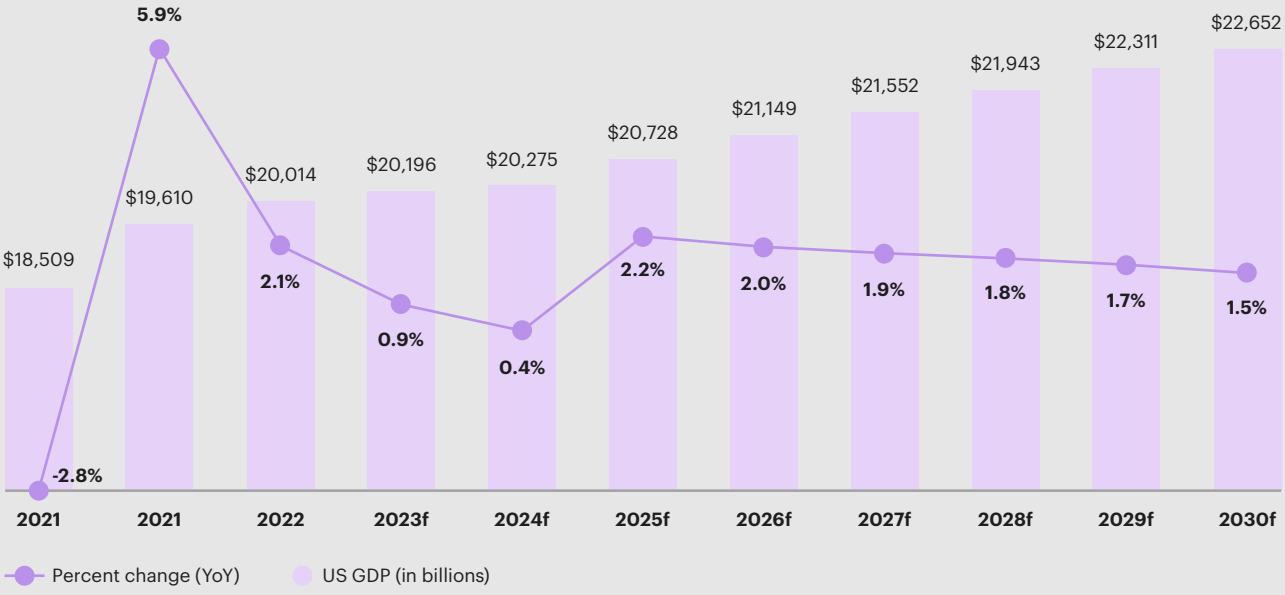
State of Logistics 2023: macroeconomic trends

Each year, we begin the *State of Logistics Report* by examining the macroeconomic landscape in the United States and globally and identifying key drivers of economic activity that directly impact the logistics sector. This section will assess recent economic performance in the United States and world and provide near-term outlooks with particular focus on implications for logistics operators.

US overview: a bumpy landing ahead?

Looking back on 2022, US growth remained stable at 2.1 percent as the labor market, consumer spending, and business activity showed surprising resilience (see figure 2). This set the stage for 2023 to begin with rising optimism and a growing consensus among economists that any recession would be short-lived. The latest projections from Kearney's Global Business Policy Council (GBPC) forecast a minor recession in the third and fourth quarters of 2023, but overall, a positive 0.9 percent annual GDP growth. Indeed, Kearney GBPC's managing director Erik Peterson notes that amid declining inflation and potential signs of easing on monetary policy tightening, the US economy could plausibly avoid recession altogether. While the US economy is likely to exit a minor recession in Q1 2024, firm downside risks may set the stage for a bumpier landing. Inflation and the Federal Reserve's efforts to tackle high prices, a tight labor market, and geopolitical tensions all have the potential to add turbulence and recessionary pressures.

Figure 2
US growth is expected to be slow until 2024, then stabilize just below 2% through 2030



Sources: Oxford Economics; Kearney analysis

US economic outlook

US inflation is down from 9.1 percent seen earlier in 2022 (a four-decade high), but has stubbornly oscillated around 5.0 to 6.0 percent in 2023 so far, with a forecasted YoY average of 4.7 percent by the end of the year (see figure 3). The logistics sector, which accounts for 9.1 percent of total US GDP, has been a major contributor to inflationary pressures.[1] Logistics costs have inflated 19 percent in 2022 for reasons we discuss through the rest of this document. While the Federal Reserve hinted at a pause in interest rate hikes after bringing the target rate to 5.0 to 5.25 percent in May, it has also emphasized it will continue to act as needed should inflation remain elevated. In an interview with Julianne Dunn, a regional analysis manager of the Federal Reserve Bank of Cleveland, she stated that "historically, inflation can be pretty persistent and the effect of [the Federal Reserve's] policy actions can take some time to bear out." This compounded with the "bottlenecks in the supply chain that have also caused price volatility … will take some time to work themselves out." Nonetheless, there have been signs of success: CPI growth in April slowed to 4.9 percent (relative to April 2022), though shelter, food, and electricity remained well above the average rate.

Stubborn inflation, should it persist, will continue to incentivize the Federal Reserve to maintain its monetary policy tightening, the negative consequences of which are already being felt.

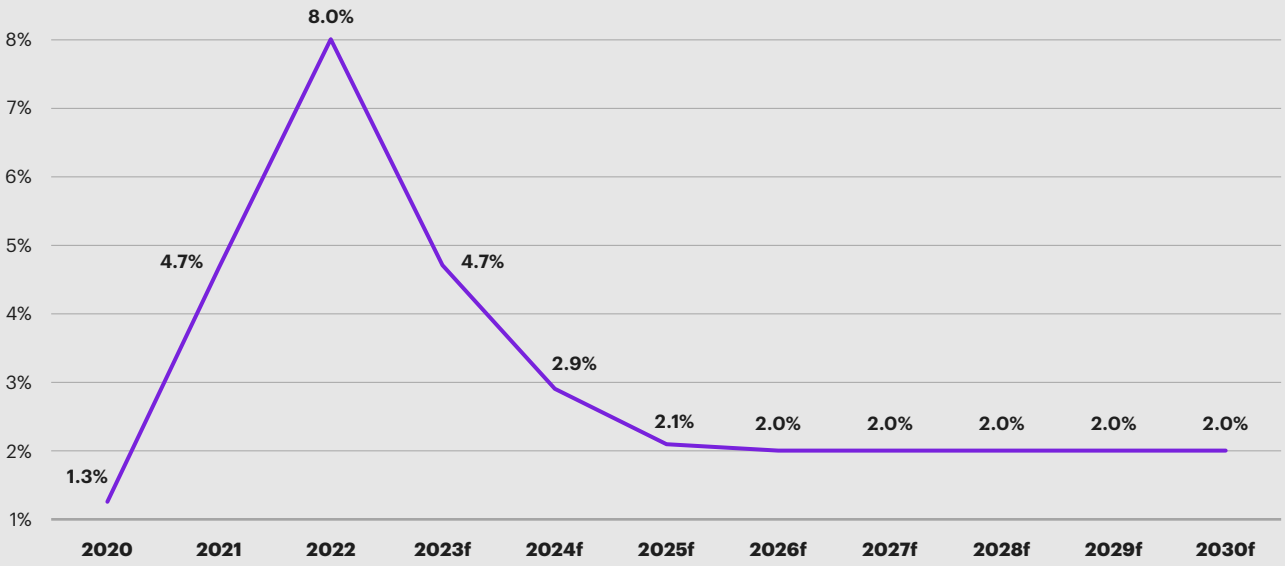
Though rate hikes have yet to slow growth significantly, cracks are emerging in the housing, technology, and banking sectors. An extreme example is the collapse of Silicon Valley Bank. High interest rates eroded the value of the bank's bond portfolio, sparking a bank run. If this weakening of confidence among corporations and consumers spreads further, it would likely exert a significant drag on economic activity. Government intervention to guarantee depositors access to all of their money seems to have staved off any cascading effects, though uncertainty around the impact of rising interest rates and banks' ability to lend looms large. Moreover, growing uncertainty in the banking sector may lead the Federal Reserve to prematurely loosen monetary policy, further complicating efforts to tame inflation.

[1] That the high point for US inflation and the logistics sector percentage of US GDP both equal 9.1 percent is coincidental.

Figure 3

Inflation is expected to continue to make a noticeable impact on consumers' pocketbooks until 2024, when it is projected to return to the target 2%

US average annual inflation rate, CPI, YoY



Sources: Oxford Economics; Kearney analysis

An exceptionally tight labor market has also been challenging the US economy. Following pandemic-induced labor market disruptions and strengthened demand from fiscal and monetary stimulus, the US unemployment rate has hovered near an almost half-century low, between 3.4 and 3.7 percent since March 2022 (see figure 4). This has forced firms to increase wages and pass rising costs on to consumers, exacerbating inflationary pressures. At the overall level, the GBPC projects the labor market will loosen starting end of 2023, though sector-specific challenges will persist. Those relating to logistics are addressed in the Logistics labor section of this report.

Given geopolitical tensions and rising incentives to reshore manufacturing, US companies have been increasingly moving supply chains closer to home. Indeed, US imports of Mexican manufactured goods grew a staggering 26 percent since COVID, according to Kearney's Reshoring Index, and reshoring now appears to have moved from a strategic possibility to a market reality. Nonetheless, the risk of reshoring efforts driving inflationary pressures or trade tensions with key economic partners will persist in the short and long term.

Economic outlook overseas

Many economies are similarly facing tempered economic outlooks. Indeed, the IMF's April World Economic Outlook points to rising uncertainty around financial sector stress, inflation, the conflict in Ukraine, and lingering pandemic shocks for 2023 and 2024. Kearney's GBPC similarly forecasts tepid global growth of 1.8 percent in 2023, followed by a moderate recovery of 2.5 percent in 2024.

The Eurozone has just slipped into a recession, the economy having contracted for two quarters in a row. Like in the United States, inflation and a tight labor market are contributing factors, and the European Central Bank has since raised interest rates in response. Europe's sluggish growth can also be traced back to the war in Ukraine. Though Europe avoided an energy crisis this past winter, energy prices remain elevated, and increased sanctions on and reduced access to Russian energy supplies will complicate gas storage efforts in winter 2023.

Figure 4
Tight job market conditions are projected to begin to abate in 2023 before a spike then reversion to the mean 2024 and onward

Sources: Oxford Economics; Kearney analysis

Turning East, China's abrupt lifting of its longstanding COVID restrictions will likely drive growth of more than 5.0 percent in 2023. Still, China faces several headwinds, from restoring economic confidence, to property sector woes, to a breakdown of economic links with the United States. At the same time, much of Southeast Asia is experiencing notable tailwinds. Coupled with young and dynamic workforces and supportive economic policies, this is expected to drive strong GDP growth in 2023 in Vietnam (4.2 percent), Indonesia (3.9 percent), and Thailand (3.8 percent). India, too, will see powerful growth of 4.8 percent in 2023 and 6.3 percent in 2024, owing to strong investment flows, favorable demographics, and a reform-minded government.

Diversification of production away from China, European and global energy markets volatility, and strengthening government efforts to reshore are a part of the substantial rewiring of the international logistics network. The US Inflation Reduction Act, the EU Net-Zero Industry Act, and Japan's recent prioritization of "economic security" through reshoring are clear illustrations of the reshoring trend. Governments around the world are implementing policies to encourage the return of domestic manufacturing. For logistics operators, the rewiring of global supply chains will likely accelerate in 2023 and beyond, creating both opportunities and challenges as trade routes shift and global volumes potentially decrease. Nonetheless, there are limits to the rewiring of global supply chains, as interdependencies in many sectors built up over the past decades are unlikely to be fully unwound in the near term.

The uncertain road ahead

Overall, the anemic 2022 has given way to a weakening 2023 with Europe disrupted and slowed by the conflict in Ukraine, China rebounding though facing notable headwinds, and the United States struggling with the impacts of inflation, labor markets, and geopolitical tensions. Countries are likely to face negative growth in late 2023. Though they are expected to quickly rebound in early 2024, the aforementioned headwinds create significant downside risk. For logistics operators, while demand in the United States and globally will likely stabilize by early 2024, the prospects of worse-than-expected economic activity through this time frame should not be discounted.

Looking beyond the near term, a low growth environment appears increasingly likely, with the World Bank predicting that without significant policy changes to improve investment and trade flows, the global economy could experience a "lost decade" of instability and weak growth, slumping to a three-decade low of 2.2 percent per year through 2030. For logistics operators, preparing for this uncertain economic future will be paramount. Indeed, while logistics operators needed to prioritize agility before the many pandemic-induced disruptions, they must now find ways to become hyper agile for whichever future unfolds.

The World Bank predicts that without significant policy changes to improve investment and trade flows, the global economy could experience a "lost decade."

Air

It's tough to resist turbulence metaphors when you're talking about the air freight market, especially over the past two years. A sharp rise of demand in 2021, heightened by constraint of waterborne capacity, produced a severe mismatch between demand and supply, leading to unprecedented rate hikes—average air freight rates for East-West routes grew 179 percent from Q1 2019 to Q4 2021.

Due in large part to these sharp rate increases, global air cargo revenue increased by almost 100 percent from 2019 to 2021. After reaching the historical high of $200 billion in 2021, the market took a sharp downturn in Q2 2022 and has been trending down since. Looking forward, global air cargo revenue is projected to reach approximately $150 billion in 2023. This is 20 to 25 percent lower than 2022, but still a solid 50 percent higher than pre-pandemic 2019 levels.

What triggered the market downturn?

Capacity took off but demand did not follow

In the period 2021 through 2022, carriers stung by widespread under-capacity during the pandemic responded with capital investments that would help them meet the boom in consumer demand and prevent future capacity shortfalls. This inflow of capacity included new aircraft, as well as passenger-to-freighter (P2F) conversions. In addition, as air travel rebounded, belly capacity on passenger flights became more available to shippers.

During this period, however, demand for air freight has shown a consistent downward trend, even as prices have modulated. Air cargo volumes (measured in cargo ton kilometers or CTKs) fell 8 percent in 2022 relative to the previous year, and the International Air Transport Association (IATA) foresees another 4 percent annual decline for 2023.

Several factors are at work here. Inflation-triggered interest rate hikes have dampened demand, cooling even the formerly torrid growth of e-commerce. Global e-commerce sales growth fell below 10 percent in 2022, down considerably from the 27 percent growth rate of 2020 and the 23 percent gain posted in 2021. Trans-Pacific shipments have been a major source of growth in recent years, but the reopening of China's economy, which should have been a precursor to an elevation in air cargo volumes, had little effect. Even the traditional holiday season hike in demand, which normally amps up sales in November and December, failed to create much momentum in 2022, as retailers were battling previously overstocked inventory.

To make matters still worse for air freight demand, reduced marine freight costs are causing shippers to switch from air back to ocean—a complete reversal of the trends that prevailed in 2021 and much of 2022, and which did so much to stoke the growth of airborne logistics.

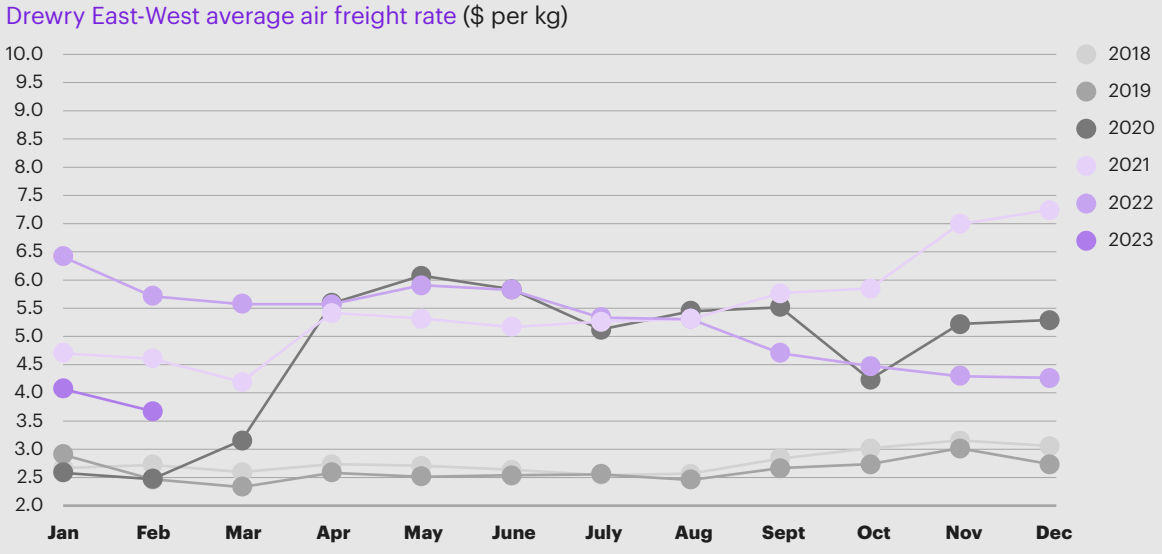
The resulting mismatch between slack demand and resurgent capacity was captured in global cargo load factor, the ratio of freight load to total capacity. This metric stood at 45 percent in January 2023, a 10 percent year-over-year dip from January 2022.

This excess of supply and insufficiency of demand in the air freight sector had a predictable effect: prices fell. As illustrated in figure 5, East-West air freight rates dropped 33 percent from January to December 2022 and continue trending down in 2023.

A primary determinant of overall air freight cost is the price of fuel. Global jet fuel prices have shown some volatility over the past two years due to several macroeconomic and geopolitical factors, but the overall trend has been markedly downward—the global average jet fuel price index has declined by about 39 percent from April 2022 to April 2023 and the current outlook is for a softening fuel market as crude oil inventories replenish themselves (see figure 6 on page 14).

Figure 5

East-West air freight rates dropped 33 percent from January to December 2022 and continue trending downward in 2023, propelled by the prevailing supply/demand imbalance

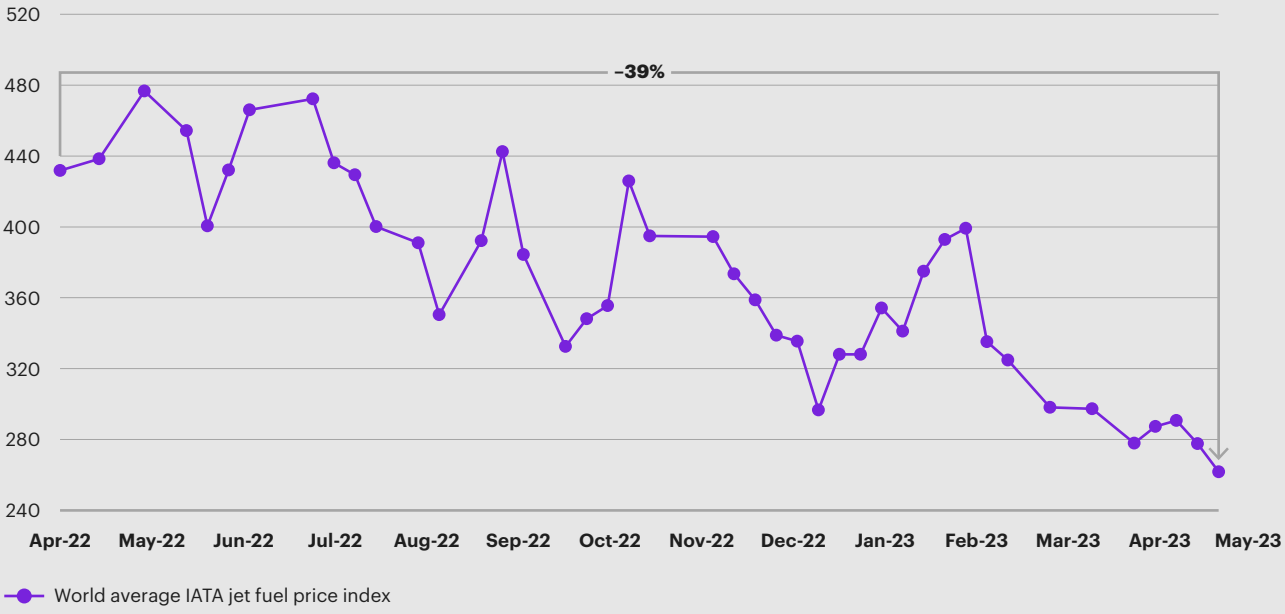


Note: Weighted average of all-in air freight buy rates paid by forwarders to airlines for standard deferred airport-to-airport air freight services on major East-West routes. Rates are expressed in $/kg and include three components: the base rate, the fuel surcharge, and the security surcharge.

Sources: Drewry; Kearney analysis

Figure 6

The overall trend for global jet fuel prices has been markedly declining over the past two years, exerting further downward pressure on air freight rates



Sources: IATA; Kearney analysis

The table has turned

The relatively sharp reset of the market in 2022 sent everyone—shippers, carriers, and forwarders—scrambling. On one hand, after a long period of "bleeding" in air freight spend, shippers are grasping the opportunity to gain back their ground, launching large-scale market events to negotiate new rates and contract terms, with significant benefit results. Some acute phenomena triggered by the pandemic-driven tight market are also being resolved, including moving away from charter flights, and removing peak-season surcharges, over-capacity markups, and other accessorials in new contracts. On the other hand, the "freighter shopping sprees" are cooling down, as carriers and forwarders become more cautious of asset investment facing a downward market outlook. For example, freighter operator Cargojet has delayed the delivery of one of its B777 converted freighters as part of efforts to manage capital expenditure, and Maersk Air Cargo has temporarily parked several leased cargo jets and dialed back flight activity in response to deteriorating demand in the air freight market.

Looking back at the rollercoaster ride of the past two to three years, several common themes become clear. Macroeconomic and geopolitical factors will likely continue driving the market volatility, which forces both shippers and carriers to stay cautious and refrain from long-term rate agreements. Six-month and quarterly contracts are common practices now. Meanwhile, the seemingly uncontrollable air freight spend in past years has taught shippers a hard lesson. Air freight is not a supply chain "emergency panacea," and it can't be managed ad hoc. Companies with large air freight volumes are reexamining how they plan, order, pay, and audit their air shipments, because levers such as demand management, load consolidation, service level rationalization, and accessorial standardization could mean millions of dollars in values captured.

Peering over the horizon

As the market volatility continues, global supply chains are being rewired through accelerated reshoring and nearshoring activities. The impact these trends have on the air freight market is still unclear, but one could expect air freight demand to drop even further. However, not all reshoring strategies are created equal and therefore their impact on the air freight market could be more nuanced.

— Growth in domestic manufacturing (reshoring) will likely lead to falling air freight utilization on key Asia–US trade lanes.

— Nearshoring, manufacturing in Mexico and US imports of Mexican manufacturing goods, has significantly grown since COVID. Although US–Mexico may not be the most conducive air freight lane, we are gearing toward a potential increase in air cargo services between Mexico and other countries such as those in Europe and South America.

— Some companies are moving out of China only to move next door to one or more Altasia countries. These moves may have a lesser impact on air freight demand than reshoring and nearshoring activities, but they will lead to the emergence of new major air freight hubs in Ho Chi Minh City, Mumbai, and Bangkok, to name a few.

Meanwhile, the industry's march toward environmental sustainability continues, with jet fuel being a main focal area. Sustainable aviation fuels (SAF), which are produced from renewable feedstocks, are increasingly utilized by air freight companies to reduce carbon emissions and environmental impact. Companies such as FedEx, DHL, and United Airlines have made significant commitments to purchase and implement SAF in their operations. Airplane manufacturers are also exploring the use of hydrogen fuel cell technology to power aircraft and reduce carbon emissions. Boeing is partnering with Universal Hydrogen to develop a hydrogen-electric aircraft propulsion system, with the goal of making hydrogen-electric regional aircraft available for commercial use by 2025. Meanwhile, Airbus is developing a zero-emission, hydrogen-powered aircraft called the ZEROe, which is expected to be in commercial service by 2035.

At operational level, companies are using advanced data analytics, predictive maintenance, and operational optimization tools to optimize flight operations, reduce fuel burn, and minimize emissions. This includes initiatives such as Lufthansa Cargo's digitalization program to optimize flight routes and reduce fuel consumption. Ways shippers are contributing to sustainability include implementing consolidation strategies (for example, shared networks or consolidation centers) and improving efficient route planning.

Such advances will add another layer of possibility and potential for an air freight sector that is still feeling its way forward now that the pandemic-era demand boom and rate increases are things of the past.

The industry's march toward environmental sustainability continues, with jet fuel being a main focal area.

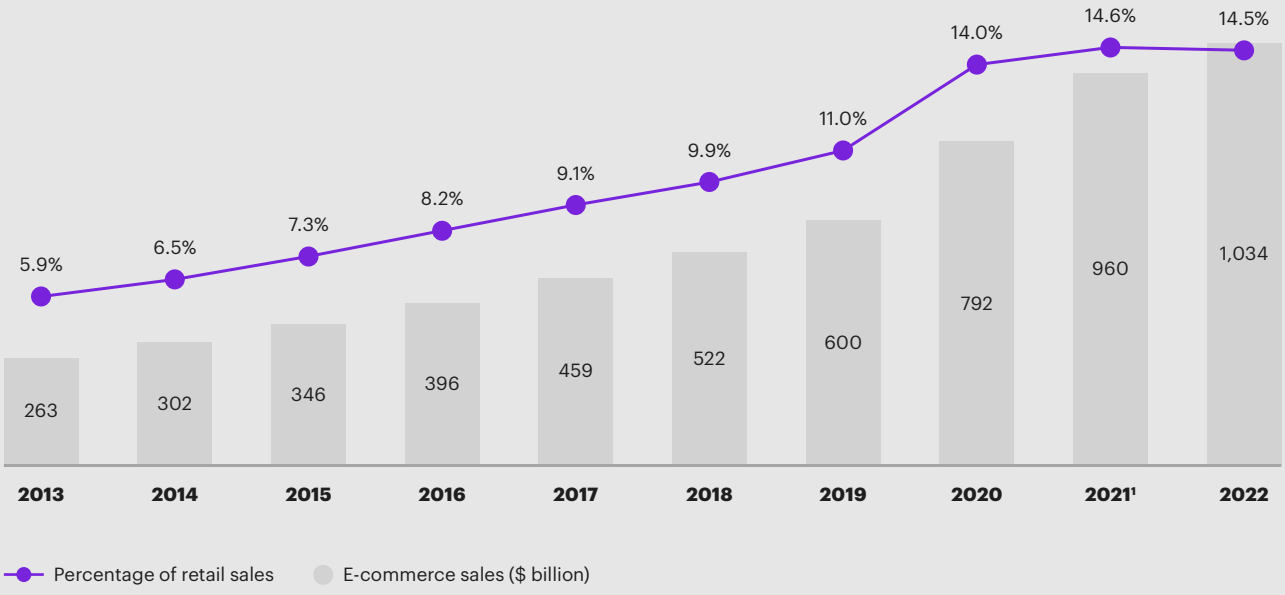
Parcel and last mile

In 2022, shifting consumer behavior and macroeconomic pressures continued to significantly challenge parcel and last-mile networks. Amid skyrocketing costs and drastic shifts in customer behavior, this "final link" in the logistics network continued to present considerable obstacles for both shippers and carriers.

One of those challenges was the need to handle the shift in e-commerce volume. Even as consumers returned to retail stores, the US e-commerce market grew by 8 percent in 2022 relative to the prior year. It is now a $1.034 trillion behemoth, representing 14.5 percent of the entire US retail market (see figure 7). However, although the US e-commerce market has grown to its largest size in history, its percentage of retail sales has started to flatten. Alongside the growing e-commerce market, the US parcel market grew 4.7 percent YoY to $217 billion in 2022 with a five-year compound annual growth rate (CAGR) of 13.7 percent. However, as the overall e-commerce and parcel markets continued to grow due to rising inflation driving increased prices and rates, overall US parcel volumes declined by 2 percent.

Figure 7
In 2022, the US e-commerce market grew 8% YoY to $1.034 trillion

E-commerce sales and e-commerce as a percentage of retail



[1] 2021 has been updated to reflect the US Census Bureau's latest revisions.
Sources: US Census Bureau quarterly retail e-commerce sales report; Kearney analysis

Although parcel volumes declined in 2022 by 2 percent from 21.7 to 21.2 billion parcels, revenues for parcel providers continued to increase as they rapidly shifted their focus toward profitability—as highlighted by UPS's "Better and Bolder" strategy and FedEx's primary strategic pillar of "revenue quality." As an indicator of this new emphasis UPS and FedEx both increased rates by 5.9 percent in 2022—the highest uptick in nearly a decade.

In addition to improving profitability, parcel carriers provided strong on-time service performance during the especially frenetic period between Black Friday and Christmas Eve, as the result of strategic investments in additional capacity, selective use of pricing levers to shape network demand, and an overall reduction of YoY Q4 parcel volume. UPS posted an on-time delivery rate of 97.5 percent during this window, while FedEx came in at 95.2 percent and the US Postal Service at 94.3 percent.

The cost and capacity pressures of 2022 have prompted all major shippers to seek such levers wherever they can find them—a search made more urgent for the entire sector as UPS faces union contract negotiations in July 2023.

For example, in February 2023, logistics operators cut approximately 17,000 jobs as e-commerce growth stalled, with courier companies cutting payrolls by 8,900 jobs and warehousing and storage customers cutting 7,000 jobs through the first two months of 2023, which is the largest monthly drop in the sector over the past decade.

In another effort to preserve margins, Amazon Fresh has instituted a minimum basket threshold of $150 for free grocery delivery services, with segmented delivery fees by basket size. Walmart instituted delivery fees ranging from $7.95 to $9.95 without a Walmart Plus membership, and free shipping for a basket size over $35.

And in response to the still-inflationary economic environment, both UPS and FedEx have announced further rate boosts, with a 6.9 percent general average increase in 2023. This move demonstrates these market leaders' continued strategy to raise prices to improve margins and actively shape demand.

2023 forward-looking perspective

Looking ahead to the state of the overall parcel and last-mile market over the remainder of 2023, it is expected that the steep e-commerce growth curve experienced during the pandemic will flatten by late 2023 or early 2024 due to inflation, a potential recession, and the continued return to in-store shopping.

This cooling in the e-commerce sector will continue to have a significant impact on parcel and last-mile provider operations. However, this deceleration of e-commerce growth doesn't indicate total parcel volume decline over the next five years, as US parcel volumes are expected to grow at a 5 percent CAGR, reaching 28 billion parcels annually by 2028.

As for same-day delivery—which continues to be a particularly challenging subsector of the last-mile network—US market size is estimated to be approximately $8 billion in 2023 and is expected to grow to roughly $14 billion in 2028 at a CAGR of 12 percent.

Amid all of these developments, there are a few key strategies shippers and carriers should consider to manage rising costs and service demands in 2023. We'll start with a look at strategies for shippers, and then shift to carriers.

The cooling in the e-commerce sector will continue to have a significant impact on parcel and last-mile provider operations.

Shipper strategies

In 2023, shippers should focus on building interconnected, fit-for-purpose networks that make the consumer the top priority, while at the same time maximizing profitability. To strike this often-delicate balance, shippers should pursue four key strategies:

— **Resist follow-the-leader strategies.** Companies each have distinct economics, customer bases, market positions, and business objectives. While it is always useful to take best practices into consideration, "being you" is central to developing and executing a successful set of service options defined by specific company characteristics and customer needs. Needs-based segmentation is key to last-mile profitability.

— **Consumer-centric segmentation of customers, products, and services.** Delivery offerings must be designed to meet consumer expectations and should be informed by commercial realities and cost-curve trade-offs. To that end, a surgical segmentation of what consumers demand (for example, service level and pricing expectations by product category) needs to be conducted and evaluated against the true cost-to-serve, in order to drive profitability.

— **Data-driven demand shaping.** The margin equation must be incorporated into the delivery service offering, requiring both a deeper analysis of nuances in demand—by product line, geography, season, peak, time of day or week, and delivery option—and internal organizational alignment to execute against those differences with better communication and incentives to shape demand. This level of margin intelligence must be fueled by advanced analytics to understand the shape of demand by product profile to drive profitability.

— **Increase optionality.** With the growing base of regional carriers and alternative last-mile delivery, it's vital that shippers evaluate their network requirements and strategically select the most cost-effective carriers on specific lanes. By diversifying the carrier base, shippers can de-risk the final link in the supply chain, while also optimizing costs. However, it's vital that shippers take into account enterprise-level contractual discounts as dipping below these thresholds can significantly swing the total cost per package.

Carrier strategies

In 2023, carriers should continue to focus on building up profitable volume levels, while also enhancing their capacity to serve targeted areas where that volume seems especially likely to materialize. To do this, carriers should consider four approaches:

— **Differentiate on service.** The cost of doing business is rising. That makes service an even more important differentiator in the eyes of shippers. This means carriers shouldn't see service and profitability as a trade-off—they go hand in hand. Therefore, focus on enhancing service to retain key customers.

— **"Sweat the asset" and only invest where necessary.** With continually evolving consumer demand, carriers should be wary of unilaterally investing in capacity. Rather, carriers should continue to increase asset utilization and only invest in capacity where there is a high probability of materialization.

— **Shape demand through pricing levers.** A sequel to the previous point, not all volume is good volume. Carriers should strategically use pricing to shape demand in order to make the best possible use of fixed assets.

— **Deploy technology to drive down prices.** As mentioned, the overall cost of doing business is rising, and this is projected to continue through 2023. As carriers look to reduce costs and improve margins while protecting themselves against labor shortages, investing in last-mile technology—such as enhanced route optimization (for example, Hoptek, Descartes), automated route dispatching, and fulfillment center robotics—is crucial. Carriers should also continue to keep their eye on longer-term technological advances, including drones and autonomous vehicles, to ensure they aren't behind the curve when these disruptors make their way to market.

For shippers and carriers alike, the back end of 2023 and early 2024 are likely to be defined by the aforementioned factors of inflation risk, the leveling of demand across much of the parcel and last-mile sector, and a continued relative growth of same-day service. How these factors play out for individual companies will depend on the choices they make regarding resource allocation and risk tolerance. We expect the shippers and carriers adopting the preceding strategic pointers will be at the fore of creative thinking and profitable action.

Third-party logistics (3PLs)

Historically, shippers have looked to third-party logistics companies (3PLs) for the levels of expertise and scale that typically fall outside their own core competencies. The decision to partner with a 3PL boils down to a trade-off: does it make more sense for an individual shipper to expend valuable capital on building greater supply chain capabilities of its own, or does it make more sense to invest in such capabilities through a 3PL?

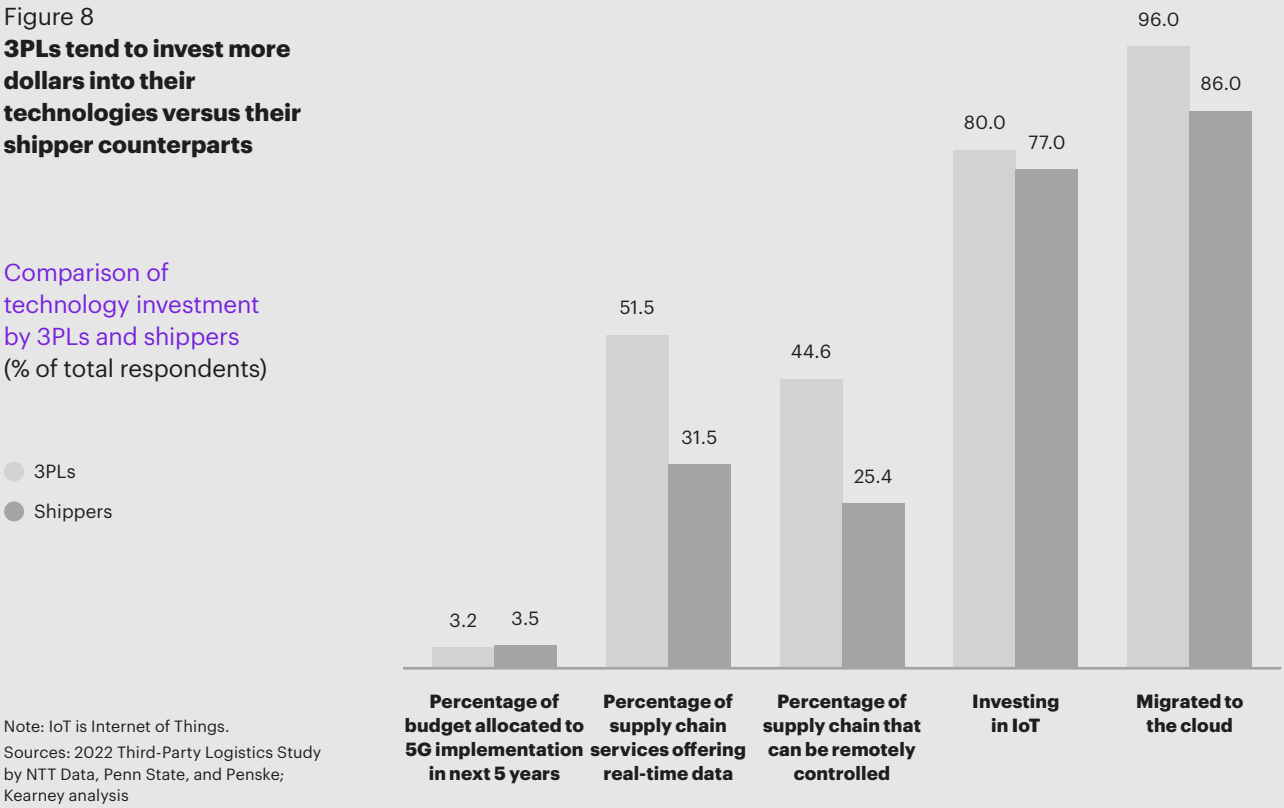
Amid the supply chain shocks and reconfigurations of the pandemic era, shippers became—if anything—more reliant on 3PLs as partners to manage their increasingly stressed and complex logistical networks. But coming out of that turmoil, it's worth asking if shippers' expectations of 3PL capabilities have undergone a lasting change.

That change is this: capabilities involving data management, visibility, and analytics are moving firmly to the forefront of what shippers are looking for 3PLs to provide. After all, these capabilities typically fall outside a shipping company's core areas of expertise—and they are not easy for a shipper to build on its own. To do so entails addressing massive complexity (for example, systems interfaces), intensive resource requirements, large capital expenditures, and long lead times.

By contrast, 3PLs have more scale to support their heavier investments in technology, as an increasingly vital means of cross-selling services and providing solutions that many shippers are currently unable to implement on their own (see figure 8).

Figure 8
3PLs tend to invest more dollars into their technologies versus their shipper counterparts

Comparison of technology investment by 3PLs and shippers
(% of total respondents)



Note: IoT is Internet of Things.

Sources: 2022 Third-Party Logistics Study by NTT Data, Penn State, and Penske; Kearney analysis

To cite just one result of this investment gap, 3PLs are nearly twice as likely to provide real-time data on items in transit as their shipper counterparts. Such a capability is increasingly important and provides a strong business case for shippers to look to 3PLs to provide such crucial tech-related functions.

For 3PLs, moving into a 4PL role can be an attractive prospect; it inherently deepens the relationship with the customer.

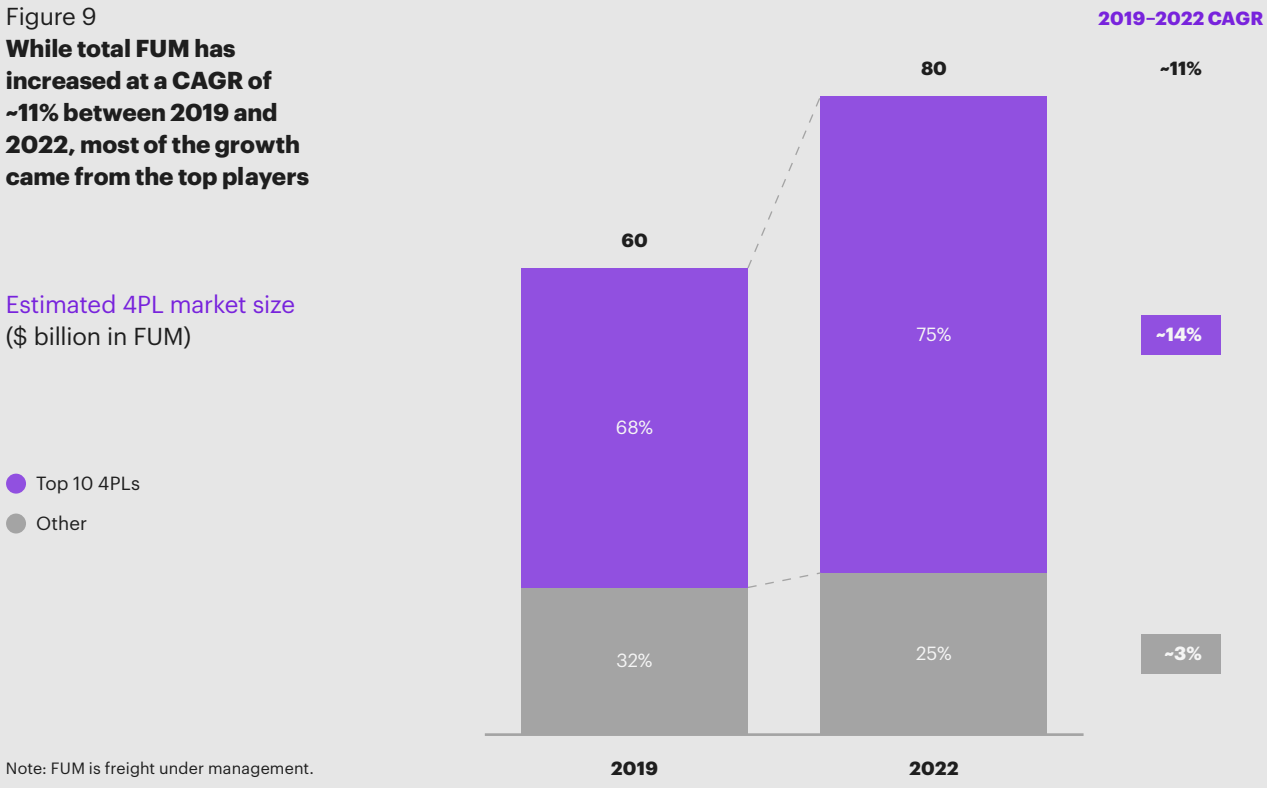
The rise of the 4PL model

The growing centrality of technology in logistics—and the gap between 3PL and shipper tech capabilities—has sharpened the traditional question of whether or not to retain a 3PL. More and more, shippers are asking not just whether to trust a 3PL with executing discrete elements of the supply chain, but whether to hand over the management—and even the design—of the supply chain as a whole.

This, of course, is the thinking behind the development of the 4PL. The abbreviation is sometimes referred to as "fourth-party logistics," but is really meant to convey the idea of a still broader set of offerings beyond the traditional 3PL model. 4PLs strive to ideally manage all aspects of their client's supply chains and act as the single interface between the shipper and multiple logistics service providers. The more advanced ones go even further and help shippers design their supply chain.

For 3PLs, moving into a 4PL role can be an attractive prospect; it inherently deepens the relationship with the customer. As shippers increase their trust in the 4PL model, they allow providers to manage more of their freight. As seen in figure 9, the primary metric used to measure the 4PL market—freight under management (FUM)—has grown in the past few years.

Figure 9
While total FUM has increased at a CAGR of ~11% between 2019 and 2022, most of the growth came from the top players



Note: FUM is freight under management.
Source: Kearney analysis

A transition from 3PL to 4PL is not an easy one to get right, which is one of the factors that might explain the growing level of market concentration. There simply aren't that many 3PLs in a position to offer 4PL-level services. As figure 9 illustrates, about 75 percent of the entire market is soaked up by the 10 largest players.

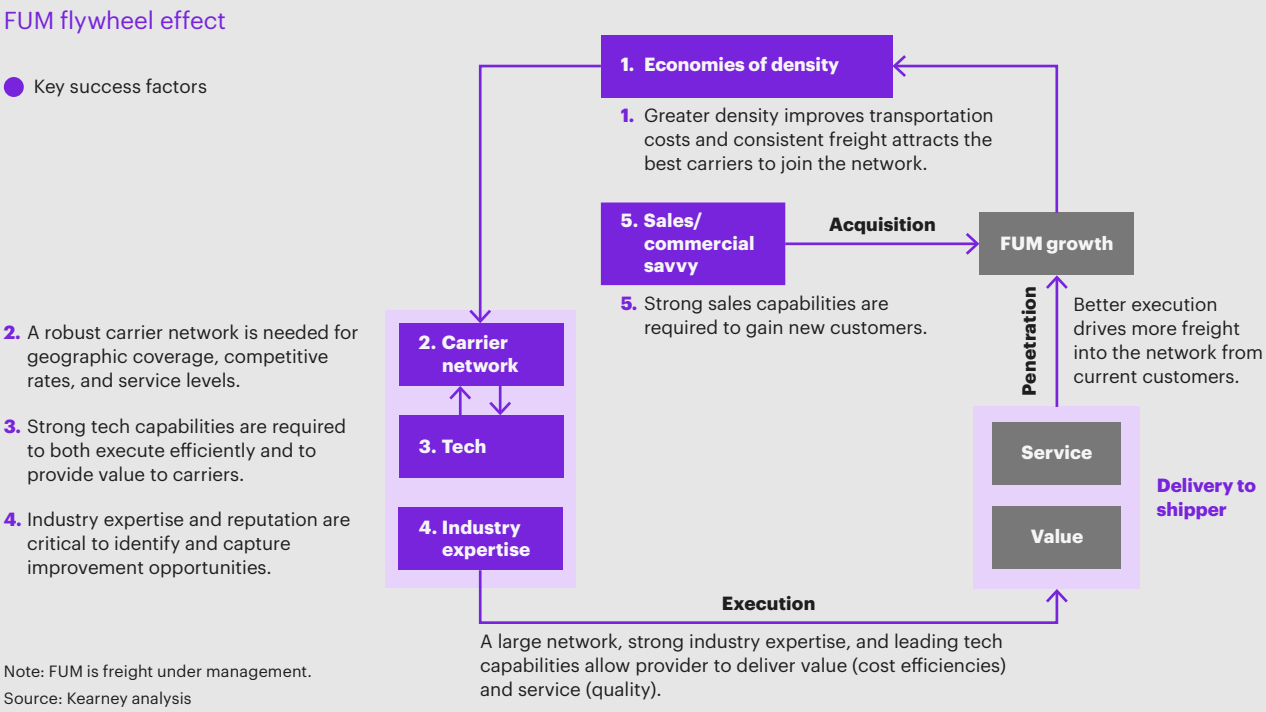
If anything, this growth is tilted toward the very top of the market. Uber Freight became the largest player in terms of FUM after its acquisition of Transplace. Other big players, such as TMC, Ryder, and Penske, have also increased their market shares.

However, persuading shippers to entrust the management of their freight to an outside party is just the first challenge. While acquiring FUM is a necessary step, the real art resides in converting it into revenue.

Figure 10 shows the reinforcing loop of FUM acquisition and execution, available only to the 4PLs with the most advanced capabilities. This loop generates what is sometimes referred to as a "flywheel effect," in which organizational achievements generate enough momentum that growth seems to become almost self-perpetuating.

About 75 percent of the entire 4PL market is soaked up by the 10 largest players.

Figure 10
FUM is the critical factor enabling advanced value delivery



Note: FUM is freight under management.
Source: Kearney analysis

How tech investments are shaping the future

Technology, then, is obviously a primary factor in determining not only whether a shipper will use a 3PL, but also whether that 3PL might be able to take on the added responsibilities (and revenues) of a 4PL.

That's because the work of a true 4PL requires the ability to offer efficiencies through design and execution, and that in turn requires some serious tech horsepower—including software for designing and optimizing transportation networks (transportation management systems, or TMS) and warehouse management (warehouse management systems, or WMS).

In the TMS sector, providers are aggressively pursuing technologies such as cloud computing, visibility platforms, and the digitalization of back-end functions. In a survey published by Descartes, 40 percent of participants cited visibility as the TMS capability that will generate the greatest value in their organization, followed by carrier sourcing (26 percent), order management (25 percent), and performance management (just under 25 percent).

Some up-and-coming 3PLs and logistics software providers are making precisely these kinds of investments. For example, the cloud-based logistics software provider Turvo has been making strides with features such as route matching, contract execution, driver performance monitoring, and turnaround time optimization. These services are crucial for shippers that seek to enhance their track-and-trace capabilities without breaking the bank.

Tech investments are also picking up in the WMS space. New entrants are making moves as shippers face high inventory levels, scarce labor availability, and high prices for warehouse space purchased as an emergency hedge back when storage capacity was scarce. Companies such as Extensiv and Acctivate offer updated information on the location and quantities of warehoused goods, allowing shippers to manage overstocks and analyze their inventories more accurately.

Shippers' options are broader than ever: execute logistics in-house, outsource a selection of services (or all of them) to 3PLs, or trust a 4PL to find further efficiencies through technology-supported design and execution. Those players able to convince shippers that they have the necessary scope and relationships—as well as the technology and execution capabilities required—will establish true partnerships with shippers and unlock untapped value.

The work of a true 4PL requires the ability to offer efficiencies through design and execution, and that in turn requires some serious tech horsepower.

Freight forwarding

The global freight forwarding market remains on an impressive upward trajectory. It stood at $48 billion in 2021, a figure expected to rise to $90.7 billion by 2031—a compound annual growth rate of 6.3 percent.

This growth is propelled by a variety of factors, and a couple stand out: the continued growth of international trade and the tightening pressures on shippers to reduce costs and improve efficiency.

Despite these strong driving forces, the industry faces some significant obstacles that could limit or slow its growth. These obstacles include the rise in adoption of direct-to-consumer (DTC) logistics, continued problems with logistics visibility, and the inadequacy of technological infrastructure.

In short, the forwarding sector has immense potential, but also some real problems that threaten that potential. To get a clearer sense of the factors shaping the future of freight forwarding, last year Kearney launched Global Freight Forwarder Pulse Check, a comprehensive market survey of the sector. It looked specifically at the primary factors that shippers use to assess their experience with freight forwarders, and to evaluate potential forwarding partners (see figure 11 below and 12 on page 24).

Figure 11
Thirty-seven percent of the survey respondents do not agree that their freight forwarder provides E2E process visibility

Question: Based on your **experience with your primary freight forwarder**, please indicate to what extent do you agree with the following statements.

- Not applicable
- Strongly disagree
- Disagree
- Slightly disagree
- Slightly agree
- Agree
- Strongly agree

Note: FF is freight forwarder. E2E is end-to-end. KPI is key performance indicator.

Source: 2022 Global Freight Forwarder Pulse Check Survey Response

Process visibility and order management
% distribution of respondents based on degree of agreement with each statement

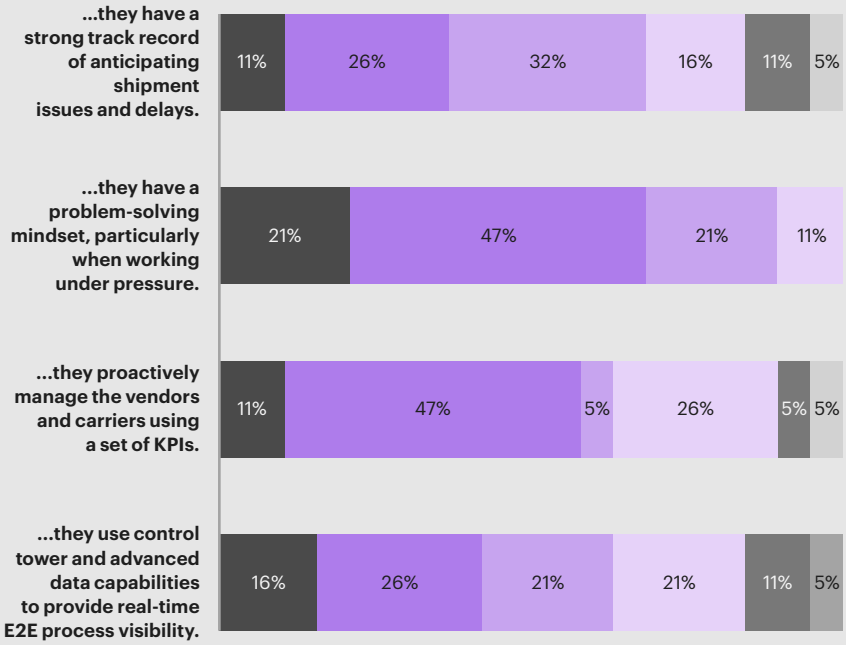


Figure 12

Shippers' responses to the survey included comments on pricing, visibility, and services

A. Pricing

"Due to shipping availability, we **check pricing often with other forwarders...** so far [Forwarder A] is competitive."
– Health company

"They **don't have the most competitive prices**, but our arrangements force them to have a transparent fee structure with us."
– Industrial products company

"We **question the meaning of contracted rates**. During 2021 we saw structural inability from our forwarder to provide us capacity at contracted rates, forcing us to accept high spot rates to move freight."

B. Visibility

"The **pace of improvements** we are seeing from our forwarders is **too slow**; we seem to see more compliance and connectivity issues raised than solutions provided."

"We **use Oracle TMS** heavily **to manage our own data, visibility** and invoicing."
– Technology company

"Data links to carriers are **never perfectly functioning**. There's manual backup processes required to get to the data we want."
– Retail company

C. Services

"We have **access to executive account management** that work hard to secure the best service and cost for us."
– Technology company

"We **contract directly with a customs broker** that is separate from our freight forwarder."
– Industrial products company

"We **contract directly with our own dray carriers**. Our forwarder offers consolidation services, but we have not participated to date."
– Industrial products company

Sources: 2022 Global Freight Forwarder Pulse Check survey response; Kearney analysis

Through the survey, shippers indicated concerns about freight forwarders' ability to provide end-to-end visibility on shipments. They also signaled misgivings about forwarders' capacity to proactively manage carriers and vendors, and their ability to design cost-efficient networks that can also satisfy increasingly strict regulatory requirements for sustainability outcomes and reporting.

We distilled the lessons from these and other studies to create three imperatives for freight forwarders: agility, visibility, and flexibility. The next section briefly reviews each of these in turn.

Three imperatives for freight forwarders

Rising pressures on supply chains—both at the peak of the pandemic and in the period since—have led to increased market consolidation among freight forwarders, causing them to shift their strategic focus toward three basic imperatives: greater agility, higher degrees of visibility, and an improved capacity to handle the digital requirements of e-commerce.

As unanticipated supply chain disruptions have become more frequent, and fluctuations in demand increasingly the norm, freight forwarders have needed to become more agile. This includes the ability to quickly fill gaps in a shipper's supply chain, accommodate last-minute changes in shipping needs, and gain access to capacity without firm commitments or meaningful advance notice.

One of the keys to such agility, of course, is visibility—the ability to clearly see what is happening along the supply chain at any given time, and to accurately track packages and shipments throughout their journey.

This became a paramount value during the chaos of COVID-19, when logjams and stockouts and missed connections diminished visibility to a degree that many shippers found unacceptable. Even as the pandemic has waned and shipping activities have stabilized, the heightened demand for visibility and transparency is here to stay. A high degree of visibility allows shippers to, among other things, develop clearer and more grounded expectations for delivery times for current orders and transit times for planned orders.

Certain kinds of visibility are especially prized by shippers. They are increasingly insisting on swift and simple access to booking capacity—that is, information about whether a forwarder or carrier actually has capacity at any given time. Such notice enables shippers to work with forwarders to optimize shipments.

It is increasingly crucial that forwarders be able to support the greater complexity of shipper needs across a plethora of new channels and offerings, such as value-added services and digital capabilities.

The biggest and most important channel of all is e-commerce. The COVID-19 outbreak not only tested supply chains but also accelerated e-commerce activity globally—making it one of the most preferred methods for consumer purchases. The rise in e-commerce has required forwarders to adopt new digital capabilities to ensure on-time delivery of goods (see figure 13).

For example, DB Schenker, a leading global logistics provider, recently opened an automated e-commerce logistics facility located in Spain. The purpose of the hub is to service customers in Spain, Portugal, and France with an efficient and flexible online order fulfillment and returns handling facility. This new facility is one of the many examples of digital technology that is pushing the boundaries on flexibility.

Some forwarders have acquired digital capacity through acquisition of other firms. For example, the freight forwarder Yusen Logistics recently acquired the fulfillment provider Taylored Services. The purpose of the deal was to use the Taylored Services automation stack to improve Yusen's e-commerce fulfillment times.

Figure 13
Service quality, cost, and accuracy are the top three factors prioritized when evaluating a service experience

Service quality drives shippers' trust

84%
of respondents chose **service quality** as their key decision-making factor when availing **documentation management and paperwork service.**

Sources: 2022 Global Freight Forwarder Pulse Check survey response; Kearney analysis

	1st priority	2nd priority	3rd priority
Freight services	**Cost** (63%)	**Accuracy** (26%)	**Speed** (11%)
Order management	**Accuracy** (84%)	**Speed** (5%)	—
Warehousing and distribution	**Service quality** (42%)	**Cost** (32%)	**Speed** (5%)
Freight consolidation	**Service quality** (47%)	**Cost** (21%)	**Speed** (11%)
Customs brokerage	**Accuracy of declarations** (74%)	**Ease of process** (16%)	—

The freight forwarding future

The turn toward digital solutions is increasingly seen as a way to address all three of the aforementioned imperatives. Digital freight forwarding—in which shippers themselves have access to a digital platform that allows them to manage logistical processes without relying on any other outside party—will continue to expand in share of the forwarding marketplace as shippers address the needs for highly responsive and agile systems, end-to-end visibility, and the integration of global modes into domestic planning and operations systems.

The digital freight forwarding market was valued at $2.92 billion as of 2020, and is expected to reach $22.9 billion by 2030, registering a CAGR of 23.1 percent, according to Allied Market Research. But there are still some unique hurdles that the digital subsector must overcome, such as lingering communications problems between customers and freight forwarders using different digital service providers.

There are signs of a continued trend toward broader, more comprehensive offerings, seeking to provide the benefits of economies of scale, as well as more comprehensive value chain management solutions.

This move toward a broader suite of services will mean different things to different shippers. For small and medium shippers, the access to more of a "turnkey solution" for logistical needs will allow them to leapfrog their current capabilities. However, it's an open question as to whether this comprehensiveness will mean as much to the largest shippers, who may be returning to more direct relationships with carriers as capacity availability stabilizes. It's a growing concern for freight forwarders, who are leery of being carved out of such lucrative potential sources of revenue.

Another concern for the overall health of the sector, despite its recent growth, is the increasing difficulty that new entrants face in gaining early-stage capital. After a gold rush of investments toward more established providers, such as Flexport, Sennor, and Forto, there is a concern that the market may shrink to just these established service providers.

At the very least, it seems clear that the capital flow has been and will continue to be more favorable toward companies in later stages of development. This could be a sign of maturation and consolidation in an industry that has shown great dynamism in recent years—or a sign that the engines of that dynamism may be in danger of cooling. Either way, the imperatives to provide heightened agility, visibility, and digital capacity will determine the future of freight forwarding in the years to come.

The imperatives to provide heightened agility, visibility, and digital capacity will determine the future of freight forwarding in the years to come.

Water/ports

The story of waterborne freight in 2022 and early 2023 is that of a sector emerging from the most extreme market conditions in modern times: by the final quarter of 2021, capacity had been at a perilously low point relative to demand, and freight rates were soaring.

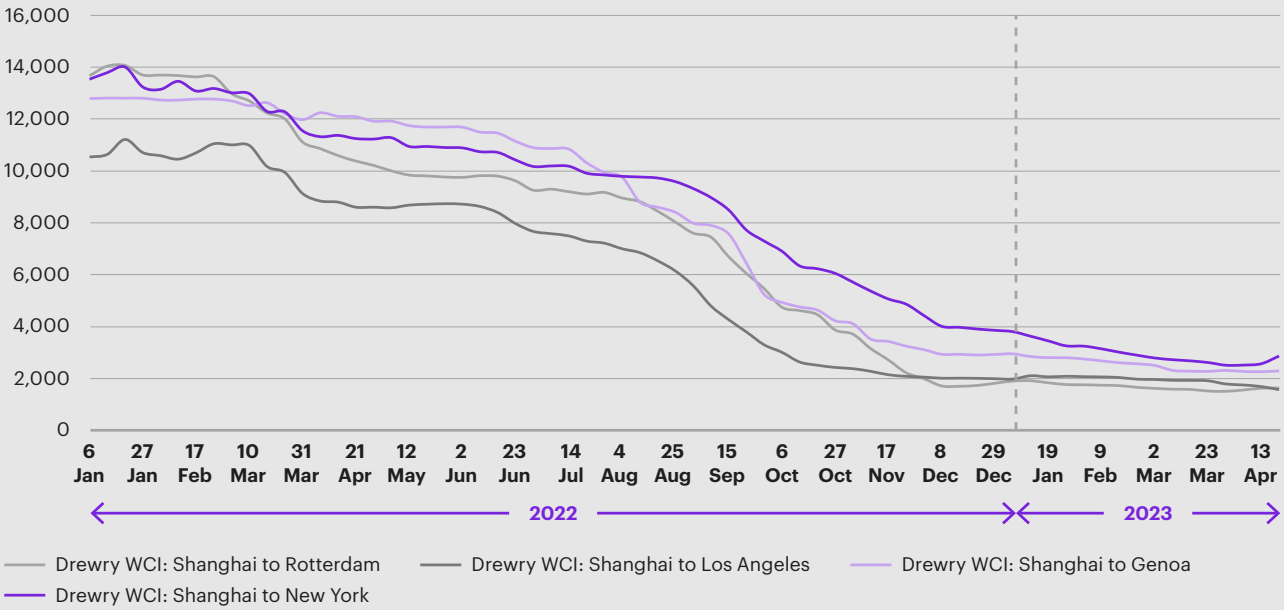
These trends continued into early 2022. By March, the average per-container rate for transit from Shanghai to Los Angeles had jumped to more than $10,000 in the Drewry World Container Index (see figure 14).

The elevated rates translated into strong revenues for carriers. Major ocean liners made combined global operating profits of $215 billion in 2022. They used these profits to further strengthen their competitive positions. MSC expanded its fleet by hundreds of vessels, Maersk acquired companies and expanded its air freight offering, CMA CGM increased its stake in Air France and paid off debt, and Hapag-Lloyd expanded its fleet and invested in port infrastructure.

Figure 14

In past 15 months, Drewry WCI declined by more than 75% on trade routes originating from Shanghai indicating a decrease in rates

Drewry WCI: trade routes from Shanghai (US $/40ft)



As 2022 progressed, however, the seascape began to shift. Demand from inventory-saturated shippers (as well as goods-saturated consumers) began to tail off. Ships and containers, at a premium during the pandemic, became more available. Port disruptions became less common, and transit times began to shorten.

In addition, the $703 million in port infrastructure and supply chain funding announced by the Biden administration in October 2022 provided further assurance to carriers and shippers alike that US port capacity would be in a better position to handle future disruptions.

These trends toward lower volume and reduced demand continued into 2023 as illustrated in figure 15, although it's possible demand recovery may not be too far away, judging from the uptick in US import volumes in March 2023.

What it all means for carriers: profits sink to the bottom, and blank sailings return

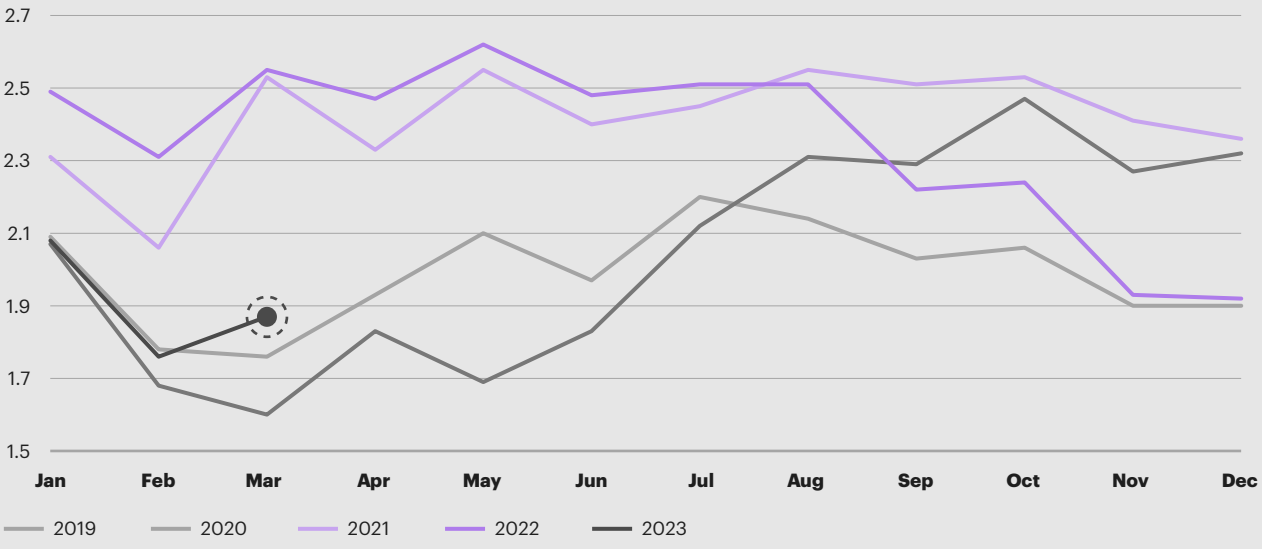
What do all these shifting market dynamics mean for carriers and shippers? Let's look at carriers first. After raking it in throughout 2021 and the first half of 2022, carriers' 2023 global profit levels are projected to be $43 billion, down 80 percent year over year. Not surprisingly, analysts have also reduced their 2023 revenue and earnings estimates for major dry bulk and liquid bulk carriers such as Stolt-Nielsen and Odfjell, following their record-breaking summer in 2022.

Carriers are now exercising caution given an overcorrection in supply. The first quarter of 2023 saw blank sailings return in earnest, especially on routes originating in the Asia Pacific region. Drewry's canceled sailings tracker found that over one five-week window in February and March, 66 percent of all blank sailings worldwide occurred on eastbound trans-Pacific routes, 27 percent on traffic from Asia to northern Europe and the Mediterranean, and 7 percent on westbound trans-Atlantic lines.

Figure 15

Container import volumes to the United States increased by ~6% in March but were ~26% lower than the same time last year

2019–2023 US container import volume (TEUs in millions)



Note: TEU is twenty foot equivalent unit.

Sources: Descartes Datamyne; Kearney analysis

Yet this capacity restraint pales in comparison with the amount of ship capacity being launched in 2023 and beyond. The Flexport Freight Market Update projects that overall container fleet capacity is set to increase by 23 percent over the remainder of this year. MSC's recent actions capture the tug of war between the desire to rein in capacity and build it out: even as it has returned a portion of its chartered ships and scrapped older vessels to adjust for demand, the company has ordered around 130 new ships that will come online over the next 3.5 years.

One small counterbalance to this increase in capacity is a new International Maritime Organization (IMO) regulation, introduced in January, that mandates reduced shipping speeds—a measure that will cut available capacity by 4 to 6 percent.

The impending breakup of the 2M alliance between Maersk and MSC in 2025 may result in lower rates and increased competition, especially on certain trade lanes. In the long term, this could lead to the formation of new strategic alliances or cause other carriers to rethink their own alliances as they seek to differentiate themselves by investing in technology or capturing larger portions of the value chain.

Carriers may also differentiate themselves by offering express service without trans-shipment, potentially resulting in shorter lead times. A survey by Drewry in 2020 found shippers were willing to pay a 13 percent premium on average for premium shipping services. While this figure depends on several factors, such as the value of cargo, the competitive landscape, and the state of alternative modes, express shipping is a potential area of opportunity for capturing increased revenues. However, carriers should weigh the costs of offering express shipping against the potential revenue benefits.

In a high-fixed-cost, low-variable-cost business, carriers must recognize that every container counts—so they need to find marginal gains wherever they can. Inland services are usually less profitable than overseas shipping due to shorter transportation distances and higher competition. However, by also focusing on inland services, carriers can offer more comprehensive end-to-end solutions to shippers and reduce empty container movements, resulting in better control of efficiencies and costs.

Legislation around antitrust immunity for foreign carriers is another potential shaper of the competitive landscape for carriers in late 2023; whether the Federal Maritime Commission (FMC) will entirely remove exemptions or just increase scrutiny remains to be seen.

What it all means for shippers: expanded options now and for the future

Shippers, by contrast, have entered a period of new possibilities. In 2021, the high carrier rates and falloffs in capacity and service left them feeling burned. As capacity began to loosen up in 2022, shippers renegotiated everything—and carriers, sensing the shift of the tide, have generally been quick to concede on most points.

Shippers at the Transpacific Maritime Conference this February mentioned they have been able to negotiate much lower rates and shorter-term contracts—even two-month or three-month deals in some cases as shippers want immediate discounts and carriers hope for market recovery.

In this new environment, shippers are sourcing capacity with an eye toward diversifying their carrier options, boosting operational efficiency, and maximizing their flexibility to respond to whatever the market does next.

Such explorations of new options are a lot less costly this year than they have been in recent history, and the expansion of relationships, routes, and options will give shippers more ability to position themselves for the long term as they build sourcing agility in the short term.

Areas that shippers can now work to shore up include the strengthening of land-side operations (steer clear of returning to bad port pick-up and drop-off habits, just because demurrage and detention charges have decreased significantly), and the development of ocean freight strategies that will stand up against volatility.

As the conference-goers at TPM noted, one play that shippers can now run with much greater ease is the pursuit of shorter carrier contracts, which open far more options than longer-term deals that bind shippers to relationships—and rates—that may or may not serve their interests over an extended period. This, coupled with the fact that longer-term contracts saved very few shippers in 2021 as "contracted" capacity became unavailable at contracted rates, has created a permanent shift in how shippers view the need to create and sustain more ocean capacity optionality.

Shippers now have room to set up spot-buy capabilities and run mini-bids to help ensure that they can stay ahead of the market no matter what happens. If rates keep heading down, mini-bids keep carriers aligned to the market; when prices start to head back up, shippers can use them to get ahead of requests for increased rates.

Shippers should seek a portfolio of relationships to maximize negotiating position across a wide range of scenarios, with an eye toward both long-term growth goals and potential short-term volatility.

Shippers should seek a portfolio of relationships to maximize negotiating position across a wide range of scenarios.

In addition, shippers are always well-advised to ensure they've developed the necessary visibility capabilities to track carrier compliance to promised rates very closely; only then will they know whether they are getting superior outcomes from their rates and relationships.

This is also an ideal time for shippers to align their ocean strategies and carrier relationships with the rapidly changing geography of sourcing, including the shift to reshoring and nearshoring. For example, due to varied concerns about supply surety, companies are moving demand out of China, and we will see more carriers develop routes serving Southeast Asia and the Indian subcontinent as a result.

Finally, shippers should see this as an optimal time to hone their sustainability strategies, an especially important consideration as regulatory and reporting requirements increasingly measure companies' carbon emissions and other environmental effects across the entirety of the supply chain. Europe's move to activate the carbon border adjustment factor heightened compliance costs for imported goods, and 2022 saw a further elevation of status for alternative fuels in the bunker market, despite the impact of higher fuel prices, with demand for gas-powered ships decelerating significantly following last year's record gas prices.

Such a tightening of sustainability requirements puts more pressure on shippers to ensure that their logistical operations are running as efficiently and cleanly as they practicably can. Fortunately for them, this is an ideal time to select carriers that can help them deliver on that priority. On this point—as on so many others—it's the shippers who are steering the boat now.

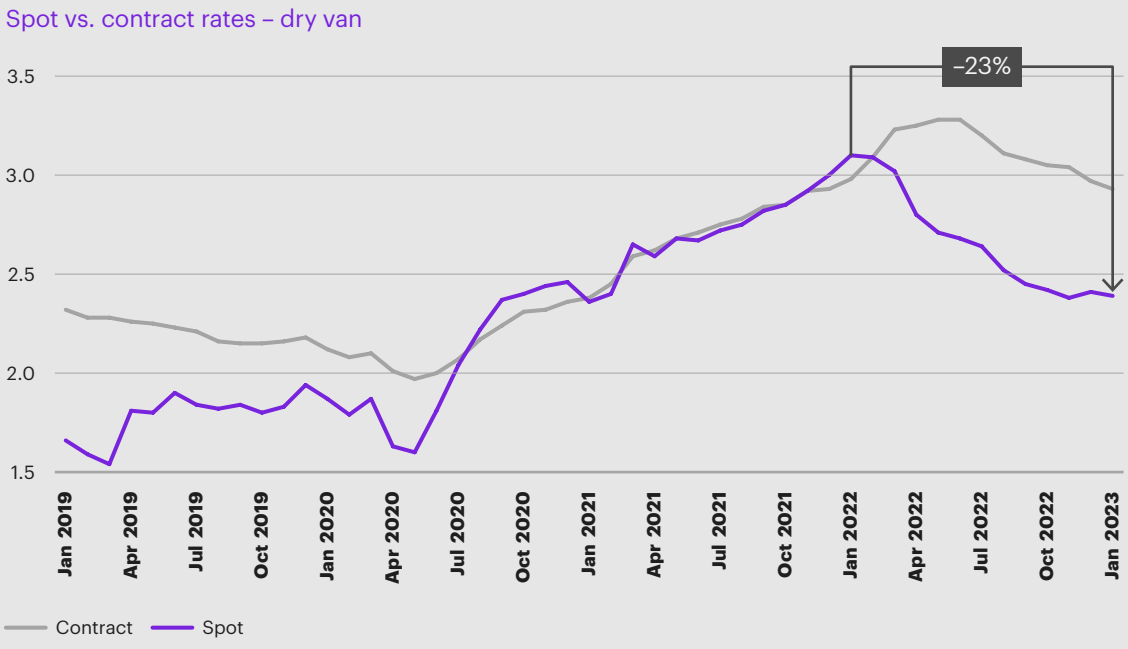
Motor

In 2022, the demand for over-the-road (OTR) transportation remained relatively unchanged from the previous year, reflecting widespread concerns regarding inflation, rising interest rates, excessive inventories, and the possibility of an economic recession. At the same time, the available capacity saw an increase. The DAT Freight & Analytics dry van load-to-truck ratio is the lowest it has been since June 2020, signaling significant levels of capacity in the market. While most carriers remain focused on maintaining yield, the combination of decreased demand and excess capacity has put pressure on carriers to increase service levels. Rates of tender acceptance, on-time pick-up, and on-time delivery have risen back to pre-pandemic levels.

Another impact of falling demand and rising capacity has been a significant decrease in both spot and contract rates. However, these two pricing categories have not been affected equally. While contract rates typically lag spot by three to six months, early 2023 has shown the largest spread in contract and spot rates in the past three years. DAT's dry van rates show a 23 percent decline in spot market rates between early 2022 and early 2023, with contract rates showing less decline during that time (see figure 16).

Figure 16

Spot rates witnessed a sharp decline throughout 2022, with contract rates lagging ~6 months behind



Sources: DAT; Kearney analysis

With improving service levels and falling spot rates, shippers are turning to the spot market rather than to their contracted carriers to optimize costs. To mitigate a flood to the spot market, the 2023 bid season started early, and carriers are revising contract rates in order to preserve relationships—resulting in a somewhat faster decline in contract rates in early 2023.

The next two subsections will look at how these capacity and pricing dynamics affect the two central players in road-borne logistics. First, we will look at the impacts on shippers, and then turn to carriers.

Shipper impact: reevaluating logistics strategies

Given these shifts in market conditions and business priorities, shippers need to reevaluate their logistics strategy, weighing the sometimes-conflicting priorities of agility, cost, and service.

During COVID, shippers prioritized service levels over agility and cost, resulting in a shift toward usage of dedicated fleets. However, as spot rates and service levels of common carriers improve, there will likely be a shift toward more traditional trucking arrangements, a reversal of the trends that we had seen over the past year and a half.

This shift presents an opportunity for companies to create a "muscle" around the dynamic reevaluation of their logistics strategy—optimizing their balance of modes between dedicated, private, and one-way services. To do this, shippers should build a toolkit that enables them to match the right lanes with the right modes based on market conditions, demand profiles, service level agreements, carrier requirements, and lane-level costs.

"The 2023 'shippers' market will come to an end in Q4 2023–Q1 2024 and no shipper should be caught off guard unless they have ignored the needs and opportunity to improve their capabilities and their 'shipper of choice' behaviors."

Rob Haddock, Coca-Cola North America, Transportation Strategy

As part of this toolkit, we recommend shippers increase the frequency of their pricing events to continually look for better outcomes and increased flexibility. Carriers and third-party logistics providers (3PLs) should still be sourced annually in order to reset rates, but new capabilities are needed. Shippers should complement these annual sourcing activities with spot-pricing and mini-bid strategies, to ensure more dynamic adaptations to changing market conditions.

In this new environment, sourcing and operations teams must work together to plan their approaches to capacity planning, freight sourcing, and carrier management—and then make the moves necessary to advance on all of these fronts proactively, well before the market forces the company's hand. This is a vital discipline for shippers in upward markets and downward markets alike.

Over the coming year, it will be interesting to see if the market returns to pre-pandemic tendencies or if the pandemic left a lasting impact on shell-shocked shippers. If the market does reset to the former status quo, we would expect to see shippers bowing to cost pressures and opting for lower rates and more fungible agreements. If, on the other hand, the hard lessons of the pandemic seem to be sticking, it's likelier that shippers would maintain their preference for high service and dedicated capacity arrangements. Right now, only time will tell which tendency shall prevail.

Carrier impact: effects of rate pressures

Carriers, too, have been significantly affected by 2022's market dynamics, their margins squeezed by low rates, the imperative to boost service levels, and high resource costs for labor and fuel.

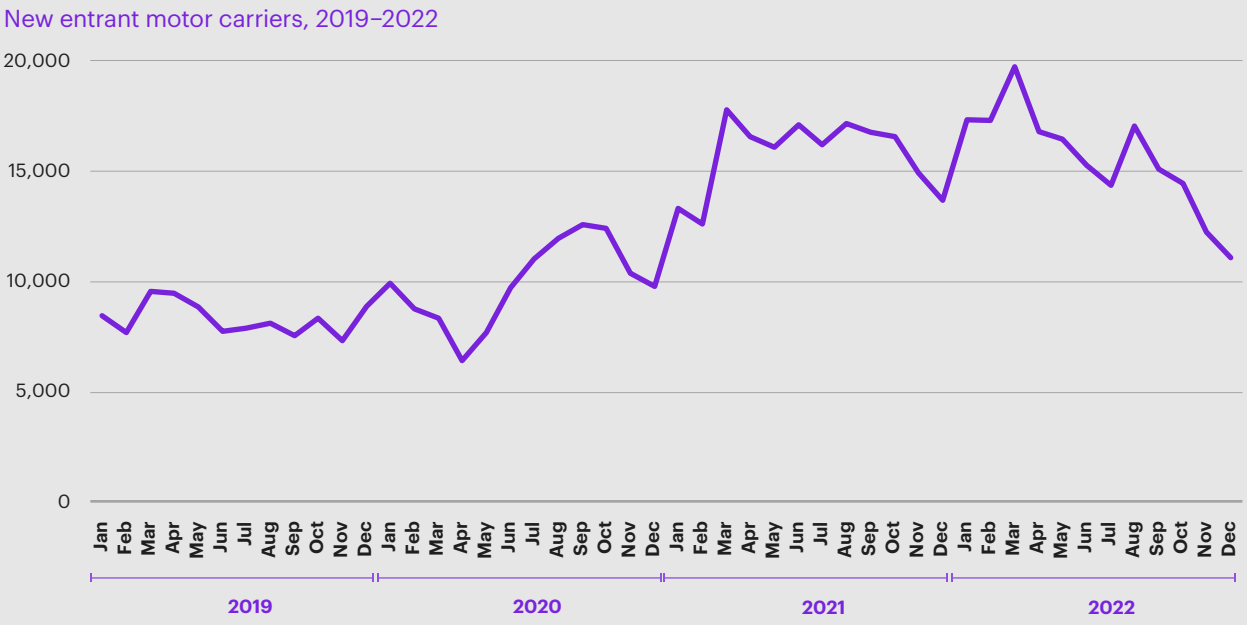
Smaller carriers—after gaining from spot market volatility in recent years—felt the most pressure and were forced to make strategic decisions to protect themselves. Throughout 2022, these decisions fell into three broad categories: switching to the contract market to minimize volatility, joining forces with a larger carrier, or leaving the market altogether.

The same factors that forced these hard choices among existing carriers had the effect of deterring new carriers from entering the market in the first place. As figure 17 illustrates, after skyrocketing during the pandemic, the number of new motor carriers fell back toward pre-pandemic levels by December 2022, indicating that a once prosperous freight cycle for truckers has ended. Even with a decline in new entrants, Class 8 orders witnessed a significant spike in early Q4 2022 (see figure 18 on page 34). This suggests that the majority of the added capacity will be primarily absorbed by the major incumbents, further displacing smaller carriers.

Although large multi-modal carriers had greater adaptability compared to smaller entities, they too faced market pressures. Nevertheless, to safeguard their profit margins, these larger carriers could reallocate resources to more profitable and stable service lines, such as less-than-truckload (LTL) and dedicated services, making them more resistant to market fluctuations. As a result, major carriers such as JB Hunt and XPO reported revenue growth due to changes in their freight mix.

Figure 17

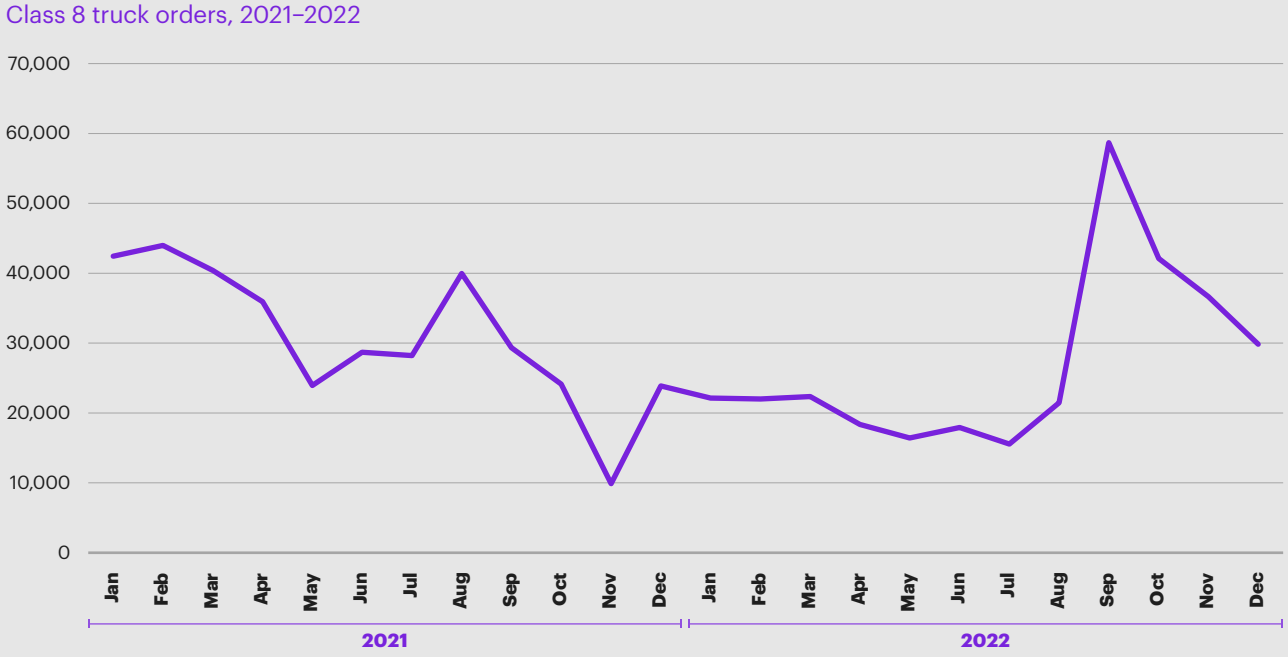
As a result of market and economic conditions, new motor entrants dropped back toward pre-COVID levels by the end of 2022



Sources: Motor Carrier Management Information System Database, January 2023; Kearney analysis

Figure 18

Carriers continued to invest in new capacity as indicated by the spike in Class 8 truck orders in October 2022



Sources: FTR Transportation Intelligence; Kearney analysis

For small and large carriers alike, labor shortages continue to pose a crucial challenge. The American Trucking Association expects this lack of drivers and other personnel to worsen over the remainder of this decade. This concern is by no means unique to the trucking sector. The dearth of available workers is a source of worry across a range of logistical subsectors—enough so, in fact, that for this year's *State of Logistics Report* we have dedicated a separate section to the topic.

In the specific case of trucking, though, it is not entirely clear whether the true problem is a driver shortage, driver turnover, or suboptimized planning. There are indications that rate shifts and the move away from a spot market that had afforded some drivers a measure of freedom as owner-operators during the pandemic is forcing many drivers back to the large carriers—or out of the market completely.

This year, the severity of the driver shortage has been acknowledged by top government officials. The Safer Highways and Increased Performance for Interstate Trucking Act, or SHIP IT Act, introduced to the house earlier this year, provides recruiting and retention incentives to truck drivers with the objective of bridging gaps in the US supply chain. "We need to recruit, train, and retain truck drivers to keep our supply chain moving, while also updating best practices to improve trucking to fit our modern economy," noted Congressman Jim Costa of California.

While the Act improves driver experience by providing $7.5K in tax credits for drivers who logged at least 1.9k hours in a year, and $10K in tax credits for new drivers, it does not address the issue of how many hours drivers can work in a day or improve the utilization of the current labor force. To address the immediate labor challenges, carriers should explore ways to enhance the utilization of their workforce. Based on Kearney studies, on average, over-the-road carriers use about half of drivers' available hours, and of that number, 10 to 25 percent is unproductive movement. Carriers should use routing optimization solutions such as Hoptek, a Kearney company, to reduce unproductive driver time—efficient implementation could nearly double the labor capacity through improved planning of driver time and reduce empty miles through optimization.

But there is a balance that needs to be struck here. Any carrier that goes unreasonably far in trying to squeeze every last iota of productivity out of its drivers risks running into a larger problem: namely, that in order to mitigate the labor problem over the longer term, carriers will need to focus on the quality of the driver experience to identify the most effective levers for attraction and retention.

As the labor section discusses in greater detail, the traditional approach of focusing solely on compensation will only go so far and is undifferentiated across carriers. Carriers are struggling to hold their drivers, with 40 percent of truck drivers searching for new jobs (6 percent increase from previous year). Furthermore, sign-on packages that were offered with the intent of attracting talent have proved ineffectual, as some drivers have jumped from carrier to carrier to scoop up these incentive payments.

Carriers are struggling to hold their drivers, with 40 percent of truck drivers searching for new jobs.

Carriers will need to look beyond strictly monetary compensation to determine what other levers they can use—such as consistency in pay and workload—that might correspond more closely with the priorities that actually influence drivers' decisions to take or leave a position with any specific company.

Looming behind the trucking sector's labor questions, of course, is the massive question of whether or when autonomous driving will be deployed at any appreciable scale. James Reed, Kodiak's COO, is optimistic about the future of automation, stating that the "manifestation of Kodiak's commercial vision is there, [and] has come to pass," and that "most of the [autonomous] manufacturers' ODD is feature complete," and they are now focusing on the safety case. A future with autonomous driving is near. One widely discussed potential model is one in which autonomous systems guide trucks on long-haul stretches, with human drivers taking over on denser more complicated last-mile routes within metropolitan areas.

Methods such as platooning (in which two or more trucks are linked in convoy to reduce air drag and promote fuel efficiency) or the assignment of a single human driver to an entire convoy of autonomous trucks are among the potential early steps toward a broader rollout of this technology, but they likely will not materialize until the early 2030s.

There is a patchwork of state regulatory environments across the United States where autonomy is legal, with more than 40 states allowing some sort of autonomy. In July 2021, federal legislation amending the Road Traffic Act and Compulsory Insurance Act allowed motor vehicles with autonomous capabilities in specified operating areas on public roads. There is still a long road ahead before such vehicles become ubiquitous, but the truck sector's labor concerns may be accelerating momentum toward that day. In the meantime, carriers of all sizes need to be more strategic about how to maximize all of their resources in a market still fraught with uncertainty.

Rail

The railroad sector experienced higher revenues and operating income in 2022. The largest railroads (known within the industry as Class I, with lower-revenue systems referred to as Class II or Class III) raised their operating income by 8 percent compared to 2021, and total revenue by 14 percent (see figure 19).

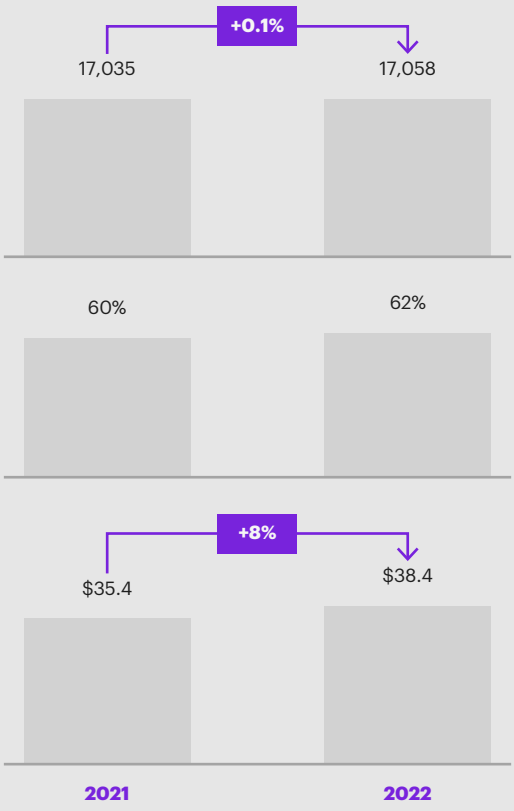
These gains were driven primarily by price increases, predominantly among lines hauling coal, automobiles, and general merchandise (a catch-all category that refers to retail items other than food and groceries, such as clothing, furniture, and consumer electronics).

But that inflationary pressure cut both ways for the railroads; even as rate hikes padded their income and revenue, they suffered their first annual decline in operating ratio in several years. This dip in OR (a common industry metric that calculates operating expenses as a percentage of revenue) was driven partly by rising prices.

It was also driven by another factor bedeviling the railroads in 2022: stagnant levels of overall service quality. Network speed remained unchanged compared to 2021, but was still slower than in the pre-pandemic years. Terminal dwell (the amount of time train cars spent in rail yards) increased, leading to congestion throughout the system.

Figure 19
Class I's did not experience meaningful carload growth, however operating income rose by 8% YoY

2021–2022



Source: Kearney analysis

Then there were issues with safety, notably several derailments—including the widely covered accident in East Palestine, Ohio—that have brought renewed attention to rail protocols. Such mishaps have created pressure for tighter regulation of the industry, with uncertain potential effects on sector profitability.

Underlying these service issues is an ongoing shortage of certain major resources. Intermodal chassis availability was tightly constrained throughout 2022, but an even more concerning shortfall is a longstanding lack of willing and qualified workers.

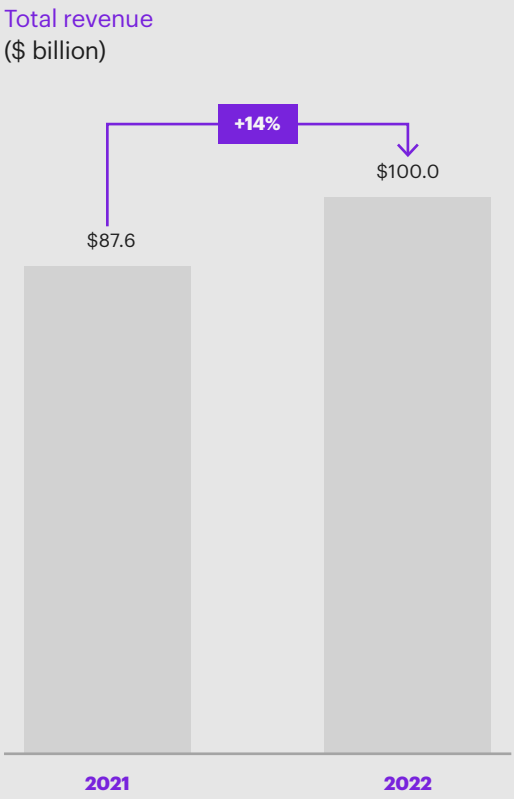
This has been a pressing issue for railroads, especially since the onset of COVID-19, though it eased somewhat in 2022—employment among the Class I railroads was up 4.2 percent last year, thanks to large-scale recruitment efforts and compensation incentives such as sign-on bonuses and relocation packages.

As a result of all these cost, service, and resource pressures, aggregate carload volume for Class I's was flat from 2021 to 2022—albeit with considerable variance in rates of increase or decrease for different classes of goods (see figure 20).

For example, even though rail shipments of coal have been declining in recent years, they rose by 11 percent in 2021 and an additional 3 percent in 2022 in response to higher natural gas prices and an increase in US exports following global trade restrictions. Metallic ores and metals shipments were down by 3 percent in 2022, after a 15 percent increase in 2021. Automobile shipments were up by 6 percent versus 2021, as supply chain bottlenecks loosened.

Figure 20
Revenues rose by 14% YoY, driven primarily by price increases

2021–2022



Source: Kearney analysis

Rail's underutilized structural advantages

Looking ahead at the sector's future, it's hard to avoid a stark conclusion: rail should be doing better. Its up-and-down outcomes of recent years are difficult to square with what would seem to be its significant structural advantages.

Companies across virtually all industries are seeking ways to reduce transportation costs and balance future capacity availability; improve labor productivity; and meet their environmental, social, and corporate governance (ESG) targets. Rail transport allows them to make progress on all of these fronts, and on others besides.

Rail has several attributes that should make it the mode of choice for shippers, particularly when compared to medium-haul and long-haul trucking—a form of transport that, on average, costs up to 15 to 20 percent more than intermodal rail. While railroads face capacity constraints, particularly during periods of undersupplied truck capacity, rail transportation offers a cost hedge against rising labor and fuel costs—one intermodal train with two operators could replace up to 300 trucks and drivers.

If rail companies want to once again experience real growth, they will have to make changes that reflect these changing realities.

Rail is also a relatively ESG-friendly mode of shipping, with 60 percent fewer carbon dioxide emissions per ton-mile than trucks. In addition, it is generally safer for the public, the recent high-profile derailments notwithstanding. Its closed-network infrastructure results in fewer fatal accidents, as well as in a reduced strain on open infrastructure networks such as highways and seaports.

Despite these and other apparent advantages, railroads have failed to realize their full growth potential. The sector is often its own worst enemy, with a legacy culture and mentality ideally suited for the operating environment of the mid to late 19th and early 20th centuries, when it was one of the most dynamic and influential industries in the entire global economy.

It's a mindset that tends to emphasize short-term financial results, while frowning upon the strategic risk taking that might generate longer-term prosperity (including non-core growth investment). It prioritizes here-and-now efficiency at the expense of lasting resilience, and competition among rail companies over the kind of mutually beneficial collaboration that could advance the entire sector against its modal rivals.

This cluster of tendencies no longer serves railroads well. The very nature of logistical transport has changed markedly since rail's heyday, from the bulk shipment of commodities such as coal, grain, steel, or chemicals to today's highly intermodal delivery of standardized containers. This new mix requires a very different set of capabilities, with a higher priority placed on service and visibility.

In sum, the logistical network that railroads once dominated has become far more competitive, complex, and interconnected. If rail companies want to once again experience real growth, they will have to make changes that reflect these changing realities.

Getting back on track

So far, the predominant response to this state of affairs has been a heavy emphasis on improving the operational efficiency of their carload business. While this is fine and even necessary to an extent, "doing more with less" is not, by itself, an adequate prescription for healing what has long ailed the sector.

What is necessary is a far more growth-oriented approach, an intention to "do more with more." At the very least, that means reestablishing sustained volume growth. But in order to achieve this, companies will need to get more comfortable with making fundamental changes to the way they do business. Incremental fixes won't do.

For starters, railroads need to play better with others. That means investing resources to deepen current customer relationships—and to foster new ones. This includes creatively integrating with other parts of customers' supply chains.

One example would be the development of "retail" intermodal services, which involves directly selling intermodal freight to a beneficial cargo owner, or BCO. This approach could take advantage of emergent technologies that offer a level of visibility more commonly seen in the trucking sector.

In addition, new service products—such as transloading to and from non-rail modes—will extend the reach of the rail network beyond what the current infrastructure can support.

In order for such investments in customer-facing activities to succeed, full organizational buy-in is needed, and that starts at the top. Recent CEO-level changes in the industry suggest that certain outdated attitudes and priorities may be changing, with management teams beginning to reorient toward growth.

That growth will require sustained and consistent service levels, and a level of capacity sufficient to absorb new volumes. CEOs and directors will need to create space for investments that will allow railroads to both compete for a greater portion of the addressable market, and to expand that market over time. This includes investments in technologies that will help enhance visibility, improve decision-making, and facilitate interconnection with other modes.

In all of this, change-oriented executives will have a powerful force on their side. Customers stand to gain significantly from a rail sector that finally fulfills its structural potential. Such a development would give a wide range of industries important new options for shipping freight, curbing costs, and hitting sustainability targets.

At this moment, then, railroads and shippers have a converging interest in both innovation and collaboration. It's a moment that both sides would do well to seize.

Railroads will need to get more comfortable with making fundamental changes to the way they do business. Incremental fixes won't do.

Warehousing

As supply chains adjust to the post-pandemic era, the warehouse sector faces specific challenges of its own, in the form of significant excess inventory, continued space limitations, and the rising cost of labor. This section of the 2023 *State of Logistics Report* will look at each of these factors in turn.

Inventory: still too much on hand, though some relief is in sight

As other sections of this report make clear, the industry-wide inventory glut has caused problems across supply chains. The causes of that glut are straightforward and all too familiar: a sharp increase in demand for many categories of consumer goods during the COVID-19 pandemic led to commensurately sharp increases in gross output in 2021. For example, the total value of goods produced in the US retail sector reached $9.5 trillion—a 17 percent increase from 2020.

As companies raced to meet demand and ramp up production, the need for warehouse space became increasingly acute. But in 2022 pandemic restrictions eased and the demand for home consumer goods fell—resulting in a retail gross output increase of only 8 percent, to $10.2 trillion, considerably less than what market leaders had anticipated following the frantic surges of the previous year.

The resulting gap between forecasts and market realities led to an overproduction of goods and an inventory glut across many industries. Companies cut down on production in hopes of whittling down their excess stocks, and in the latter half of 2022 many companies adopted aggressive inventory management practices to reduce "days on hand"—the standard measure of how long it takes to sell inventory. Those measures included discounts and promotions, liquidation sales, repurposing and recycling, and even the outright donation of lingering goods.

Fortunately, 2023 does hold some promise for companies struggling with excess inventory capacity. There's the simple fact that customers are still buying, particularly through digital channels. The e-commerce market is expected to reach $0.9 trillion, an almost 11 percent increase over 2022. This sustained demand should provide some relief as businesses continue to strike an elusive balance: keeping enough inventory to ensure supply resilience while leaving enough slack in the system to allow for future growth and agile adjustment to shifting consumer preferences. Ravi Shanker, an equity research analyst specializing in transportation at Morgan Stanley, shared views on inventory positions and stated that "there will be varying degrees of inventory normalization in the second part of 2023, a mostly optimistic view in returning back to restocking mostly based on the health of consumer spending."

Space: too much, or not enough?

The increase in inventories was reflected in a steep decline in warehouse vacancy rates, which fell to as low as 2.9 percent during 2022—a 41 percent decrease from the 4.9 percent high of 2021 (see figure 21).

While vacancy rates did tick up a bit in the final two quarters of 2022 (reaching 3.3 percent at the end of Q4), they remained well below pre-COVID rates, which had hovered around 6.5 percent for approximately a decade before the pandemic struck.

With such historically low vacancy rates—and sustained high levels of demand due to e-commerce growth and high inventory levels—US warehouse rents soared, rising by 21 percent from 2021 to 2022. Among regions, the Northeast saw the steepest increase, with a rise of 26 percent, more than $2/sq. ft. higher than the prior year.

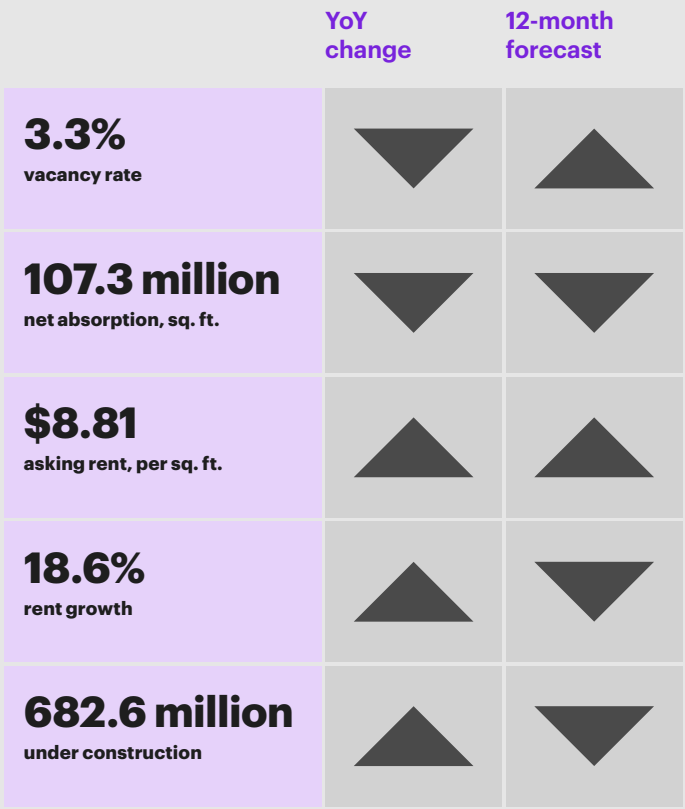
However, the upturn in rents was tempered in 2022 by the construction of additional warehousing space—the final quarter of the year posted rent increases of only 1.0 percent over the same period in 2021 (see figure 22 on page 42).

At the same time that available square footage is increasing, there are signs that companies are starting to pull back from expanding into that space. Net absorption—the differential of square footage newly occupied minus square footage vacated within a specific period—peaked in the second quarter of 2022 and decreased nearly 20 percent by the fourth quarter.

With product demand now falling, companies that may have built or leased excess warehouse space are looking for ways to pare down to a smaller square footage, with some companies (such as Amazon) even subleasing some of that overage. At the same time, construction of new warehouse space is still going strong, with a 20 percent increase year over year, driven by particularly robust expansion in the South (+28 percent) and West (+36 percent).

Our sense is that the recently constructed square footage and the availability of lease-break options are likely to result in a level of warehousing supply that will outstrip projected demand. Under such a scenario, companies will look for alternative ways to make the most of all this excess square footage, or to get out of it entirely.

Figure 21
Though the US warehouse market is projected to slow, rent is projected to continue to increase past the current average of $8.81 per sq. ft.



Sources: Cushman & Wakefield, Q4 2022; Kearney analysis

Figure 22

Warehouse rents have risen across the United States YoY, with +20% increases in the West and Northeast

Sources: Cushman & Wakefield, Q4 2022; Kearney analysis

Potential courses of action include consolidation through square footage reduction; the repurposing of warehouse space for other operations, including manufacturing; and, where feasible, the subletting of space to other companies.

The key question in this shifting market is whether the recent trends of downward pressure on prices and vacancy rates will continue. This is highly dependent on broader economic conditions, which remain uncertain over the remainder of 2023. A very high proportion of warehouse construction now in progress—83 percent—is speculative in nature.

And then, of course, there is the biggest economic wild card of all: the level of consumer spending on warehoused goods. We have seen in recent years just how suddenly consumer appetites can shift, and how vulnerable the warehouse sector has been to such sharp adjustments in demand.

Labor: wages continue upward

As the broader labor market grew over the past year, warehousing employment increased by 4.5 percent to total employment of 1.9 million by the start of 2023. That growth is partially due to the ongoing robustness in online sales; e-commerce revenue grew by 5.5 percent in 2022.

In addition, US jobs have grown in tandem with a trend toward relocating warehouses from overseas locations to domestic sites that are closer to production facilities and primary consumer markets.

Labor at warehouses continued to be a scarce resource, as the hourly cost for workers rose steadily throughout 2022. The year concluded with the nationwide average hourly wage of warehouse workers at $16.16 per hour, with the low range at $10.26 and high at $25.43. This represented a 7 percent increase from the already inflated 2021 labor rates.

Amazon has increased the starting wage for most front-line warehouse and transportation employees to more than $19 per hour, while pay in fulfillment is set to rise to $16 an hour.

The highest-paying states for warehousing labor are Amazon's home state of Washington, paying 12 percent above the national average, and California at 7 percent above. By contrast, South Carolina is the lowest paying state, at 21 percent below the national average.

To address their labor-related challenges, companies that use 3PLs are increasingly moving to open book contracts, allowing them better visibility into labor and ability to conduct related component-based benchmarking.

Companies have also gotten creative in addressing labor challenges, including outsourcing nontraditional warehouse services. For example, OnPoint Group provides outsourcing for spare parts and maintenance, allowing their partners the flexibility of having on-demand maintenance and spare-part replacements without having to hire full-time maintenance employees.

Such outsourcing will not be an optimal solution for every company, but it's an illustration of the measures some companies are willing to take as they try to navigate a labor market that remains tight. For more on how this dynamic is shaping the entire logistics sector, see the Logistics labor section of this report.

Labor at warehouses continued to be a scarce resource, as the hourly cost for workers rose steadily throughout 2022.

Sustainability

Sustainability has grown out of its former perceived status as a "nice to have," a green garnish off to the side of the plate, and is increasingly taking its place as a necessary and integral part of business operations.

Carriers and shippers are increasingly building sustainability into their business models, and for the most practical of reasons: a growing number of their customers want them to, and, as a result, regulators in a growing number of indispensable markets now require it.

The most prominent recent example of this is the US Inflation Reduction Act, which seeks to spur investment in clean energy solutions throughout logistics and other key sectors. The measure includes tax credits for vehicle purchases, as well as potent renewable-energy incentives, such as grants and rebates for ports and terminals to upgrade their equipment and reduce their emissions.

But for all the attention it has received, the Act is just one of many measures to compel corporate action on sustainability. The federal Environmental Protection Agency and the California Air Resources Board have passed new rules that will require reductions in nitrogen oxide and greenhouse gas emissions. Six states (California, Massachusetts, New Jersey, New York, Oregon, and Washington) adopted the Advanced Clean Trucks rule, which requires that truck manufacturers sell an increasing number of clean, zero-emission trucks starting in 2024—a measure that will affect 20 percent of the national medium-duty and heavy-duty truck fleet.

The United States is not the only major market ramping up on sustainability. As of January, a broader range of companies are now required to report on social and environmental impact under the European Union's Corporate Sustainability Reporting Directive. Beginning in 2024, the European Union will require that all carriers pay for the emissions that they have reported in the previous year.

In addition, the recent amendments to the EU Emissions Trading Systems will now include maritime emissions. This amendment covers 100 percent of emissions for intra-EU shipments and 50 percent of emissions for shipments to and from countries outside of the EU. Ultimately, this legislation will require carriers to pay a principal, based on their emission levels, to incentivize decarbonization.

Some of the recent regulations have been not just national or even multi-national (as in the EU example), but truly international in reach. The International Maritime Organization, for example, now requires that individual ships report a carbon intensity index that reflects the ship's deadweight tonnage, fuel consumed, and miles traveled during the previous year.

These regulations are nothing like a complete list, but they convey a broader truth. Any company seeking to do business on any appreciable scale is going to have to track and report its environmental impacts in greater detail, in more places.

It will also increasingly need to monitor those impacts across all three of the Greenhouse Gas Protocol "scopes": direct emissions by the company itself (scope 1), indirect emissions resulting from the company's purchases of energy (scope 2), and all other indirect emissions occurring throughout a company's value chain (scope 3).

This is not a trend that will slow or reverse itself anytime soon, since the impacts of manmade climate change are only becoming more apparent—and the younger generations that are especially sensitized to this issue are only becoming more economically, politically, and culturally influential.

Several large corporations (including Amazon, Walmart, and Uber) have set targets to meet the emissions goals and other sustainability benchmarks outlined across various regulatory and reporting structures. Other companies may simply want to know how, in practical terms, they can credibly signal progress on a subject that their customers, investors, and other stakeholders increasingly care about.

In this section of the *State of Logistics Report*, we provide useful perspectives on how carriers and shippers can find suitable sustainability solutions for their industries and circumstances.

We'll start with operational levers that have already been proven in the market, and then consider some emergent innovations that have deeply interesting potential for paradigm-shifting sustainability gains.

Proven operational approaches to greater sustainability

Any company in the logistics sector—shipper or carrier—looking to improve sustainability metrics will see several well-proven approaches that are relatively straightforward to implement. They are also generally affordable, and may even save money over time.

With logistical cost dynamics currently working in their favor, shippers in particular are in an optimal position to make investments in sustainability. But shippers and carriers alike should recognize that many of the measures they would normally take to improve their operations are also pro-sustainability policies. Examples of this include network and route optimization, as well as improvements in asset-utilization efficiency.

Some of the most dominant companies in the logistics industry are among the leading practitioners of such methods. For example, Amazon and other sellers are enticing customers to bundle deliveries that would normally occur across several days into a single day, increasing asset utilization of trucks and reducing shipping miles required for delivery. Another increasingly common practice is to offer alternative pick-up locations, such as UPS Access Points, Amazon Hub Lockers, and FedEx Drop Boxes to reduce deliveries at individual homes.

Carriers, for their part, have been especially active in capitalizing on sustainable reverse logistics, also referred to as the "aftermarket supply chain," in which they collect and aggregate products or materials at the end-of-life stage for reuse, recycling, and returns.

Among the tactics used to good effect is the combining of inbound and outbound shipments. For example, when a carrier delivers to a business, it will re-load the vehicle with any return shipments or material to recycle, reducing the miles an empty truck is on the road.

Another primary category of sustainability "quick wins" is innovation in uses of digital technology. While there are plenty of rather esoteric ways to use data for logistics sustainability, some easy-win technological levers are readily available.

At a minimum, companies can deploy tools such as Kearney's Carbon Cube to help procurement executives understand the main areas of emissions by purchase category, supplier, and region. This enables companies to set priorities for tackling emissions from purchased goods and services.

Top companies are using technology to improve business operations and enhance sustainability.

Walmart has launched Project Gigaton—its campaign to remove a full gigaton of carbon emissions from the atmosphere by 2030—and is supporting the effort with a digital platform that enables suppliers and carriers to develop their own emission-cutting goals and keep track of progress.

DHL is using data analytics to predict traffic routes based on location and time of day to find efficient routes, hit delivery window targets, and reduce fuel consumption. The company has also established a digital platform to monitor news and social media posts to identify potential supply chain problems.

At a prominent US retailer, advanced analytics were used to identify fleet backhaul opportunities, resulting in target reduction of empty miles by 4 to 5 percent and an annual reduction of approximately 4.8k tons of CO_2 emissions.

Emergent innovations—and smart investments

Then there are the investments we've been seeing in more speculative and forward-looking technologies—all of which hold significant potential for companies looking to achieve accelerated sustainability gains down the line.

When thinking of ways to reach the goal of net-zero emissions, companies are typically targeting alternative fuels, equipment, and technology. On the vehicle fueling front, Walmart is planning an all-electric fleet of more than 5,000 vans to support orders through InHome, Walmart's unlimited delivery offering for subscribers. Meanwhile, DHL is teaming up with Grundfos to pilot a liquid natural gas/biofuel blend that could reduce truck emissions by 85 percent.

In 2022, Coca-Cola FEMSA (KOF), the world's largest Coca-Cola franchise bottler by sales volume, began to operationalize its ESG strategy. KOF partnered with Kearney to redefine its electromobility strategy by transitioning its fleet into electric vehicles to comply with its SBTi (Science Based Targets initiative) commitments. As part of the process, KOF and Kearney identified roadblocks and risks associated with the transition to determine the right speed given KOF's operation in less developed markets. As a result, KOF has a clear road map to inform its ESG journey by optimizing it operations, its fleet, supply and ancillary equipment availability, and renewable energy sourcing.

In the area of advanced equipment, Amazon is pushing aggressively toward autonomous truck-driving systems. While this initiative may take time to be fully accepted into the supply chain, once implemented it could have an enormous impact on delivery networks. With regard to digitalization, companies are moving forward with telematics and Internet of Things (IoT) technologies to track vehicles and generate real-time fleet data.

While large online and brick-and-mortar retailers are making these and other leading-edge investments in sustainability, keep an eye on smaller companies that are offering innovative solutions of their own. This is a moment of great ferment in the green-tech sector, and large shippers and carriers have an excellent opportunity to collaborate with—and learn from—the start-ups that are pioneering the future of sustainable logistics.

In the maritime and port sector alone, there are more than 500 start-ups. Many of these companies are utilizing data analytics and automation technologies to make waterborne shipping more efficient and more sustainable.

Advanced analytics are also shaking up ground transportation. At Leaf Logistics, analytical tools are used to support automated fleet planning, improving visibility on asset availability to seamlessly match demand for backhaul, round trips, or continuous moves to boost multi-shipper network efficiency.

> **"We see transportation as a coordination problem more than a win–lose competition problem."**
>
> **Anshu Prasad, Leaf Logistics**

Another noteworthy example of ground transit innovation is Remora, a Detroit-based start-up that has developed a device, mounted directly on the back of a semi-truck, that can absorb up to 80 percent of CO_2 emissions.

Such innovations are increasingly available across logistical modes. Not all will be useful for every shipper or carrier, but the options are becoming more accessible, more affordable, and more effective each year. And the companies that gain the most from them will be those that are willing to jump in, try out what works, and not wait for competitors to get there first.

As we all know, sustainability is not a one-and-done proposition; it will be the work of decades. But this is an excellent time to begin making the right moves.

Network trends

Network overview

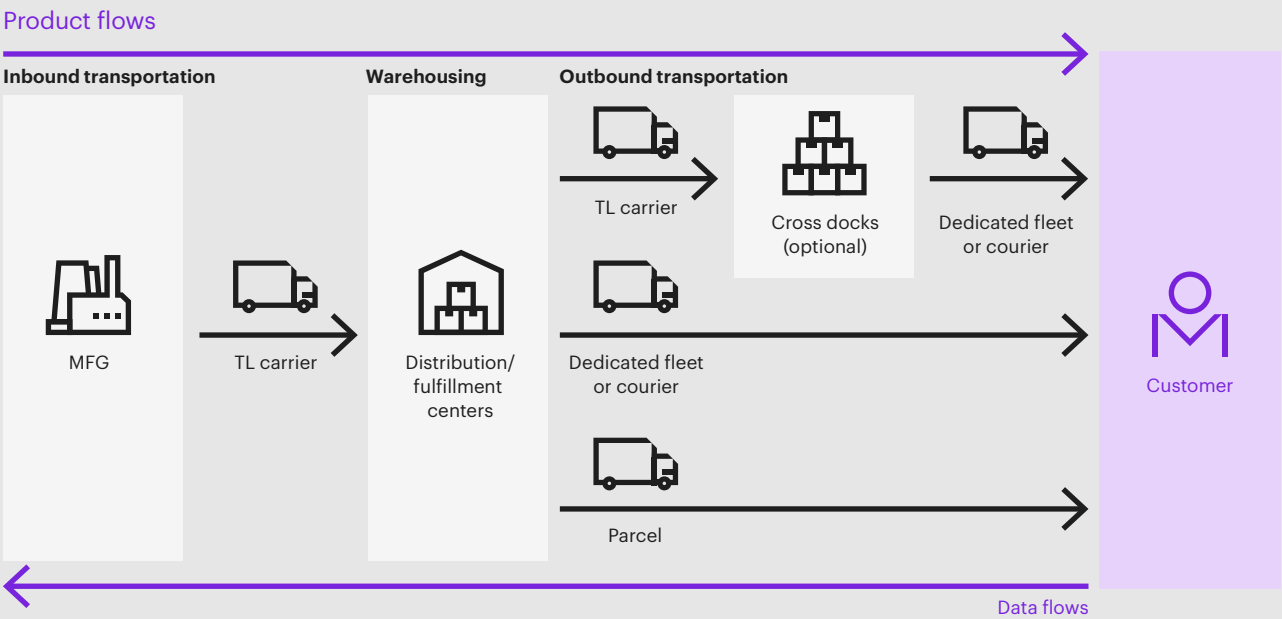
Logistics, by definition, is all about networks—the physical, digital, and organizational infrastructures that connect buyers with sellers, makers with suppliers, producers with consumers. Every section in the *State of Logistics Report* is about some link, or collection of links, in this transglobal chain.

So, why have a separate section about networks themselves? Because while there is value in looking in depth at each individual link in our supply chain (such as warehousing, or the distinct issues confronting air freight, sea freight, and ground freight), we believe there is an increasing need to look at the distribution network holistically—at the rising challenges that distribution systems face in meeting their ultimate objective: the delivery of goods at the lowest cost, at the level of service and speed that the consumer wants, needs, and expects.

Sudden shifts in ordering patterns can create significant problems for distribution networks. To see why, consider figure 23. It illustrates a basic principle of modern distribution networks, namely the value of a seamless data flow in the opposite direction from the flow of goods, enabling strategic and tactical planning.

The network disruptions wrought by the pandemic hindered the flow of goods, as was apparent in the widespread port congestions. Prior to the pandemic, flow of reliable data was a "nice-to-have" to aid planning for the supply chain; now it's a "must-have" for the supply chain to merely function. Many companies have been exposed badly due to lack of this capability, one example of which is the piling up of inventory, driven by over-forecasting due to faulty demand signals and lengthening lead times.

Figure 23
Smooth flow of product and data in opposite directions is crucial for seamless orchestration of distribution networks



Sources: Flock Freight; Kearney analysis

Turbulent times for networks

So, what are these underlying market dynamics? At the heart of these dynamics are ever-increasing consumer expectations that have reshaped the very nature of buying and selling—and placed a premium on spontaneity and ease of access. With the rapid acceleration of e-commerce and direct-to-consumer sales, boosted by the pandemic, customer orders have become more fragmented. Even as life has returned to some semblance of normality, e-commerce is expected to grow by 9 percent annually for the next five years, and 73 percent of customers report using multiple channels to shop, with brick-and-mortar sales actually increasing. Consequently, shippers are having to adopt multiple transportation modes and advanced order fulfillment measures to flow products to stores and consumer homes efficiently—a capability that many companies still lack.

Order size and frequency is not the only culprit though. Having been trained by the likes of Amazon and instant grocery start-ups in global urban markets, consumers crave speed, on-time delivery, and product variety. More than half of consumers under 35 expect same-day delivery, and a quarter will actually abandon a purchase if this isn't an option. Research has shown that customers value the keeping of a delivery promise far more than the speed of the delivery itself; they would be much more satisfied with an on-time three-day delivery than a promised next-day shipment that arrives on day three.

Customers are also monitoring those delivery promises much more assiduously; 43 percent of consumers report tracking packages more often than they had pre-COVID, as a reaction to the mistrust brewed by rampant delays during the pandemic. More than ever, they want real-time updates and proactive notice of disruptions or delays, which requires upstream supply visibility right up to the vendor level—again, a capability which many shippers struggle with. In addition, product proliferation (measured by number of individual stock keeping units, or SKUs) continues unabated, with SKU count for the consumer packaged goods sector expected to grow by 30 percent over the next five years.

These forces all converge to make distribution networks costlier and more complex. Driven by direct-to-consumer deliveries, networks have far more last-mile deliveries to handle, and far more stops that delivery vehicles need to make along a route. Although the route density (measured in stops per on-road hour) improves, the delivery density (number of drops per stop) often does not. Moreover, the rise of e-commerce has been accompanied by increased product return rates, with roughly a quarter of all e-commerce shipments sent back. This results in a higher degree of complexity and cost when compared with shipping truckloads to brick-and-mortar stores, and consequently erodes the profitability and efficiency of outbound transportation.

Given these factors, the data flows and the resulting planning processes need to be sufficiently advanced to maintain product on the shelf and avoid stockouts. The shift toward smaller parcels means an increase in demand variability, requiring a shift in demand planning philosophy. To maintain high in-stock rates, companies often route orders through a centralized fulfillment center rather than sending them directly to the customer. Needless to say, this increases the cost and complexity of inventory planning.

It's worth noting that the COVID-19 pandemic has brought supply chain resilience to the forefront of business agendas, with the number of companies experiencing more than 10 supply chain disruptions growing fivefold from 2019 to 2021. Cyberattacks and natural disasters have become more damaging and more frequent and will likely become only more so as technology continues to advance and climate change impact becomes more severe. In addition, there are some overarching macroeconomic and sustainability trends which complicate logistics—please refer to those in the respective sections.

In short, the stresses impacting logistics networks are significantly different and fundamentally more challenging than what they were five years ago, yet most companies are still adopting the old strategies to deal with these challenges. Radical rethinking is needed to set up the logistics networks for the future.

A future-oriented, holistic approach to network strategy

Traditionally, network strategy has been synonymous with analytical exercises aided by off-the-shelf network optimization software to optimize product flow paths, routing, logistics modes, and logistics providers, all with a focus on short-term cost reduction or service improvements. However, such a mechanical process has some pitfalls:

— **Overemphasizing the tactical at the expense of the strategic:** focusing on tactical firefighting before defining consumer preferences or the commercial ambitions of the organization

— **Thinking in silos:** succumbing to the common fallacy that all logistics and distribution problems are solvable within logistics and distribution alone, when in fact the most challenging logistics issues are cross-functional and require thinking across the enterprise and throughout the end-to-end supply chain

— **Underestimating the magnitude of change:** assuming that the gaps exposed during COVID-19 are ephemeral, and that supply chains will simply revert back to "normal"

To address such potential problems, leaders are taking a truly end-to-end view of their supply chains and adopting a long-term planning philosophy—networks by 2030. Planning networks for 2030 starts with understanding the current and future needs of the organization and its customers, especially commercial ambitions and the expected demand across product categories or service offerings, geographies, customer segments, and route-to-market channels. The secret sauce for effective network design is translating these needs into specific network design requirements to enable a clear view of where the network needs to go across the design of its nodes (network locations), modes (options to execute these links), and flows (designed links between nodes).

Speed, service, savings—can you have all three?

The need, in other words, is for networks that are quick, resilient, and highly responsive to customer needs. Shippers would love to provide exactly such a network, but it requires complicated trade-offs.

There are several multidimensional trade-offs across numerous design parameters for networks. Achieving the right level in one dimension often requires you to sacrifice performance in others. For example, to gain speed and high service levels, companies must increase costs and thus give up savings.

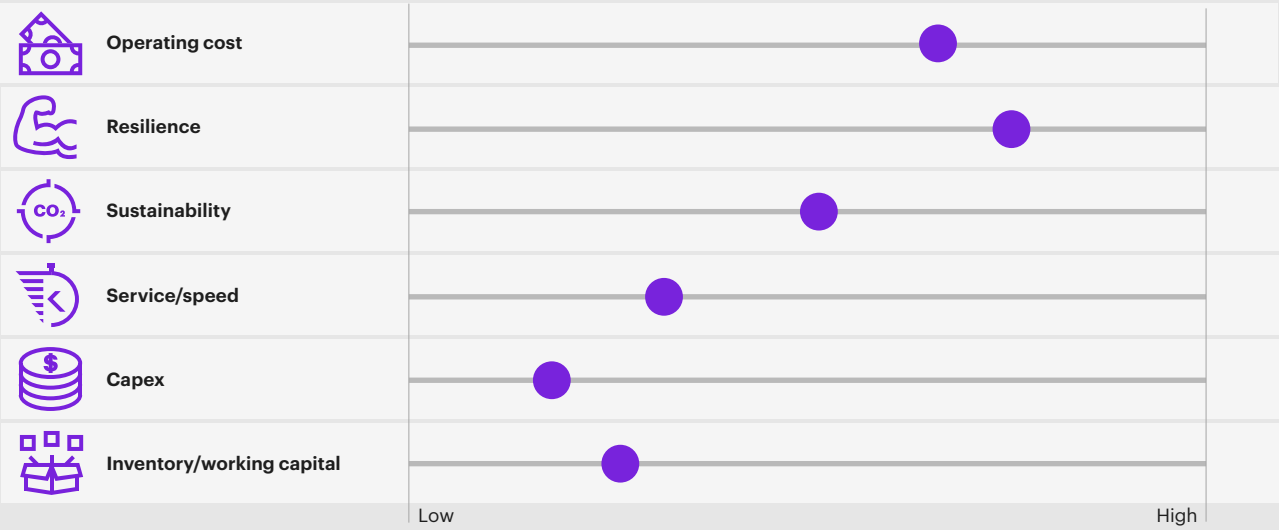
So how does one get the best of all the worlds? Figure 24 (on page 50) shows a way—the position of the slider indicates the magnitude of the desired level of the parameter, and the relative positions of the sliders are the result of a concurrent multidimensional optimum, by accepting the required trade-offs (for example, ensuring higher resilience would require high costs to achieve that).

"Tuning" the design parameters to the desired "frequency" helps achieve the elusive harmony that results when high-performing networks meet consumer needs. Each organization may have a different sweet spot for this balance, possibly differing over time as consumer needs, or commercial ambitions, evolve. It is crucial that companies revisit their network strategy periodically to determine whether a fine-tuning or major reset is required across the parameters (for example, how the positions of the sliders above need to be adjusted). A comprehensive network strategy achieves harmony through investments in new assets and capabilities, or by obtaining outside services or resources through purchasing, partnerships, or acquisitions.

Figure 24

Tuning different design parameters to appropriate levels, constrained by inherent trade-offs, is key to achieve a fit-for-purpose network

What is the sweet spot across dimensions to tailor the "fit-for-purpose" network?
(for example, medium cost, high resilience, low capex, low inventory)



Source: Kearney analysis

One example of such an evaluation of such trade-offs is the determination of locations, capacities, and capabilities for distribution centers. Massive distribution center footprints and corresponding delivery assets built to guarantee a fixed service level are becoming less profitable. Yet shippers need a large footprint to ensure supply chain resilience. E-commerce requires that certain vital customer service functions previously provided in stores—such as order bundling, gift wrapping, and product returns—are now handled at the warehouse.

All of these requirements suggest the need to invest capital in warehouses to acquire more physical space and provide workers the training needed to handle this expanded array of responsibilities. In this case, an optimal strategy is one that willingly takes up cost and capital to enable higher service levels, speed, and resilience.

Looking ahead

In summary, rethinking logistics networks is no longer a recommended action, but an imperative. As outlined above, there are many levers to pull, but they need to be orchestrated skillfully and holistically, with a concerted effort led by experts in a strong cross-functional decision-making forum, with a high degree of organizational collaboration.

Furthermore, a successful network planning process requires a solid foundation of data collection and analysis to keep the networks running, as well as intelligent investments in the right technologies. Given the turbulent nature of today's logistics environment, the foresighted planning of distribution networks should be high on any company's list of strategic priorities.

Logistics labor

Competing in today's logistics labor market

Across virtually all sectors of the logistics industry, labor scarcity has become an increasing challenge. Structural changes in the labor market mean that this dearth of qualified and willing workers will be a durable challenge—and a threat to companies' growth agendas, top-line revenues, and stock price multiples. This section of the *State of Logistics Report* describes why this is an issue that merits executive attention and how leading companies will seek to take advantage.

Employees have more power today

To put it bluntly, there simply aren't enough longshoremen, long-haul drivers, package handlers, and other workers to keep the logistics industry rolling. It wasn't always so; for the better part of the past half-century, companies had a relatively easy time filling these positions.

In the January 2023 jobs report, the US economy added more than a half-million positions, and while we shouldn't over-index on one month, this tally caught many economists by surprise. We also had a 3.4 percent unemployment rate, the lowest since May 1969, a time when many young working-age men were being drafted into the Vietnam War.

There are now 11 million job openings in the United States; in the years preceding the coronavirus pandemic, that number was hovering at around six or seven million. As figure 25 (on page 52) shows, we have the unusual case of many more open jobs than people who are looking.

The value at stake is significant. Those that invest in smart ways to attract, retain, and engage high-quality workers can develop a lasting comparative advantage.

Why the labor market challenge will not resolve quickly

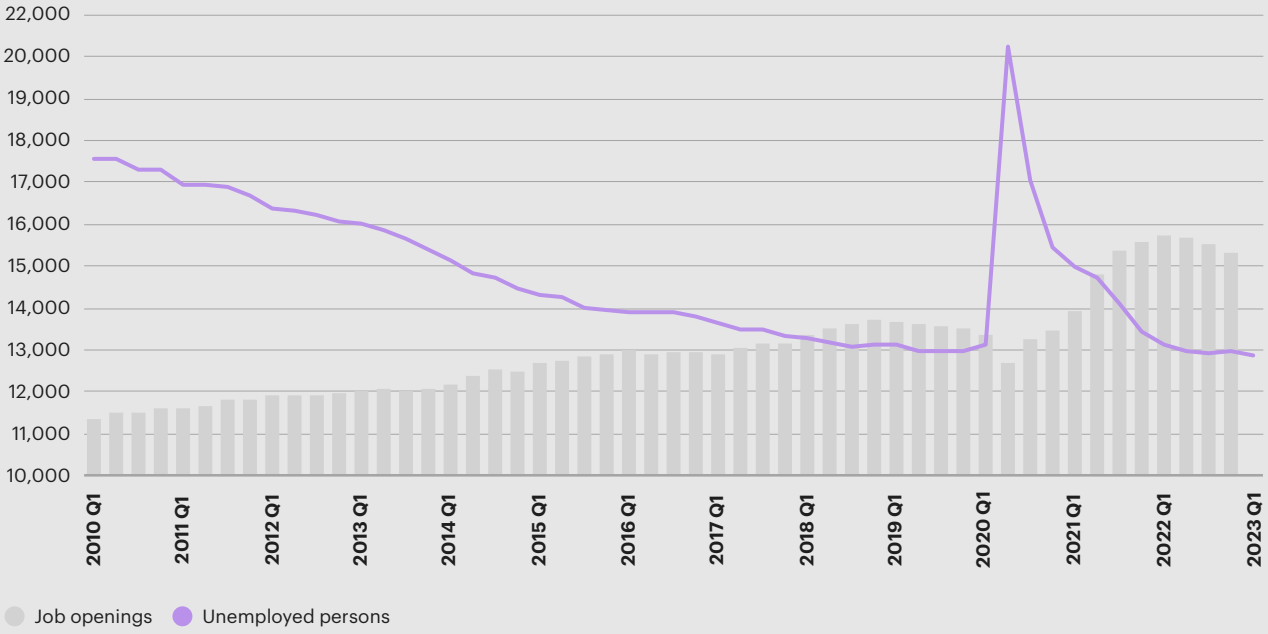
The labor market is not reverting to its pre-COVID supply conditions at any point in the foreseeable future. The reasons for this are straightforward. The working population is shrinking as the Baby Boom generation ages out—a trend accelerated by the pandemic, which sent somewhere between one million and three million Boomers into early retirement. In addition, net immigration has dropped in the past five years. These and other factors have generated labor market growth numbers that have decreased, eventually hitting zero growth in 2020 (see figure 26 on page 52).

Not only do we have fewer workers, but they want different things. Workers are far more willing to quit or to change jobs to find what they want. The labor force participation rate continues to climb, reaching 62.4 percent in January, but it still reflects a 0.9 percent drop from the pre-pandemic level. In addition, according to the US Bureau of Labor Statistics, voluntary job changes in the transportation and logistics industry are three times more common today than in 2010.

Figure 25

For the past two years there have been more job openings than individuals looking for jobs

US job openings and unemployment (in thousands)

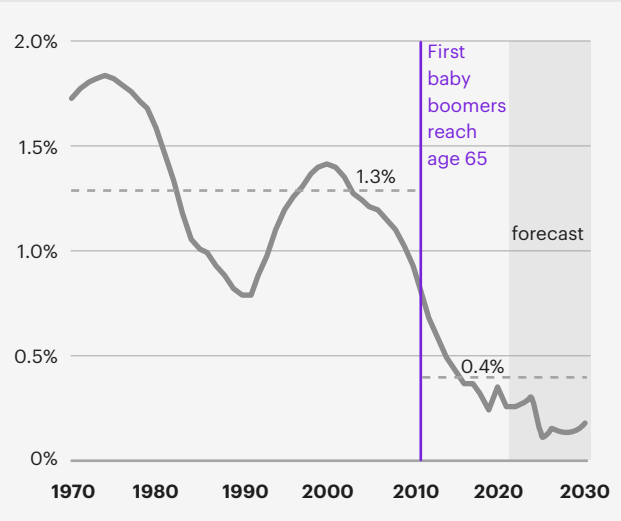


Source: Kearney analysis

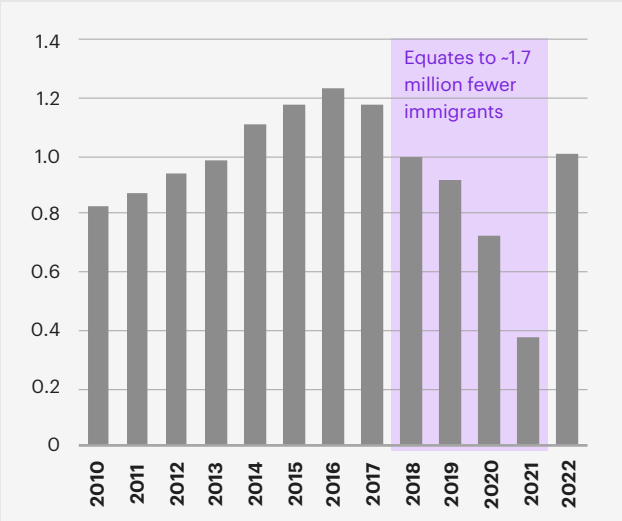
Figure 26

The number of Baby Boomers retiring and a drop in immigration have impacted the labor market

US working-age population five-year rolling average annual growth %[1]



US net international migration (in millions)[2]



[1] Organization for Economic Cooperation and Development (OECD)

[2] US Census Bureau

Source: Kearney analysis

Knowing how to compete for today's workforce

This last point begs a question: what do workers want? What are they looking for when they leave one employer for another—or for no employer at all? Most companies in the logistics sector have responded by focusing on pay. It's the traditional approach, but so far it is not working.

According to the 2022 ATA Driver Compensation Study, the median truckload driver in 2021 earned 18 percent more than the prior year, yet turnover rates among drivers have remained stuck at a very high level—above 90 percent. It's a similar situation for rail workers in the late 2022 negotiations. The offer of a 14 percent immediate wage increase and subsequent 24 percent increase over five years were insufficient to avoid a strike. Pay hikes have been similarly ineffectual in stemming turnover across nearly all other major transportation labor categories.

"In warehousing, although we see that people are returning to work, getting the right skill set is now the problem."

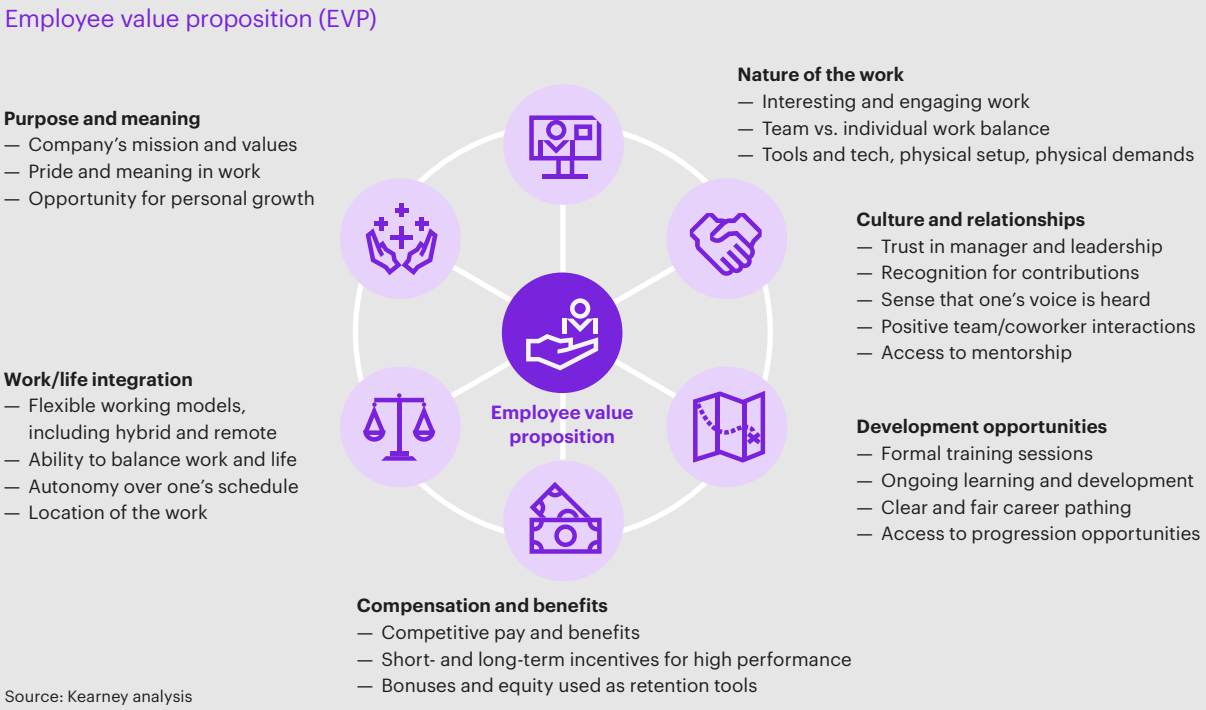
Marc Althen, Penske

This is because employees are looking for more than just an upward bump in compensation. The pandemic accelerated a longer-term shift in work priorities, toward such factors as flexibility, autonomy, career development, and a larger sense of purpose. For example, parents who were able to work remote during COVID are reevaluating the time away from kids that prior work models required. Having seen the ability of remote work to accommodate without loss of productivity, these workers are questioning the return to old models without clear rationale. Kearney has developed a full toolkit behind our employee value proposition (EVP) framework, which encourages executives to look beyond compensation and engage in more holistic thinking about how to make their jobs more attractive.

Figure 27 captures the basic themes of this model.

We are seeing companies pursuing differentiated strategies related to the EVP framework, such as significantly improving their onboarding and training procedures, managing schedules with greater responsiveness to worker needs, and finding better ways to align work with the company's core purpose and mission.

Figure 27
The employee value proposition encourages executives to look beyond compensation



Source: Kearney analysis

Many executives see technology as a means of substituting for human labor, and there is indeed a place for robotics and other applications that can handle certain tasks—especially those that are repetitive or dangerous.

But what we're really talking about here is not only deploying tech to improve total productivity, but also to better compete for human talent by improving the overall labor experience, such as increased safety or more flexible work scheduling. The bottom line is that technology is one solution among many to the labor shortage problem.

Businesses that allow competitors to build unchecked talent advantage will find themselves in a difficult situation.

Going beyond the traditional to an approach that works

To offer just one illustration of how such an integration of technology can make a positive difference, Kearney worked with a leading company that was experiencing 130 percent driver attrition despite boosting pay five times in 12 months. We responded by blending machine learning with human learning, and conducting focus groups and interviews to better understand drivers' priorities and preferences on such matters as family time and schedule flexibility. In parallel, we gathered data regarding routes, maintenance, and customers. A machine learning model was developed to assess the correlation and causation of hundreds of factors on attrition.

This blend of data science and unbiased human input led to a 60 percent reduction in attrition, yielding significant benefits through reduced recruiting, training, and quality control issues.

Attrition is not a one and done problem. In this example, managers were enabled with data that proactively identified employees at risk of attrition so they could take action. Standard reports are fine, but proactive and prescriptive recommendations that identify potential attrition and advise corrective actions are better.

Admittedly, an effort such as this is not easy. It takes work, and a willingness on the part of the company to take a hard look at some longstanding practices and assumptions. But businesses that allow competitors to build unchecked talent advantage will find themselves in a difficult situation.

Those companies that choose to pursue traditional worker retention strategies will increasingly find themselves competitively disadvantaged in the market for talent. Those that embrace the need for fundamental change and innovation in labor competition will find new avenues of robust, sustainable competitive advantage in their business that, particularly in logistics, will position them for success over time.

Appendix

Estimating USBLC

The CSCMP and Kearney strive to maintain maximum transparency and consistency. The assessment of assumptions, data sources, and methodologies that was made last year resulted in a robust research procedure that can be replicated for consecutive years. Because the structure of the supply chain did not significantly change compared to last year, it was deemed appropriate to keep most of the approach to estimating the USBLC unchanged. (See the "IHS Markit data refresh" and "Parcel market size methodology update" sections below for updates in methodology.)

Historical comparability has been preserved and the three main categories of the past have been retained: transportation costs, inventory carrying costs, and other costs (see figure A on page 56).

Transportation costs

Transportation costs are based on the Bureau of Economic Analysis (BEA) industry output. BEA US input–output accounts are a primary component of national income and product accounts, as well as of gross domestic product (GDP). BEA uses the widest variety of available source data as inputs to the industry accounts. It incorporates domestic and import–export revenues where applicable. In other words, it includes any spending attributable to an establishment within the United States. It is rebalanced every five years against US Business Census data.

Our data partner IHS Markit (part of S&P Global) used detailed BEA data, its proprietary databases IHS Markit Transearch™ and IHS Markit Business Market Index, and public company information to categorize subsegments in a way that better reflects how transportation and logistics services are purchased and used. Data was thoroughly reviewed to avoid double counting between segments.

The following definitions from last year's segmentation and definitions remained the same:

— Motor carriers are segmented into full truckload, less than truckload, and private or dedicated carriers.

— Air freight includes both cargo and air express. Consistent with BEA definitions, it incorporates both domestic and import–export revenues.

— Pipeline reflects all commodity products.

— Freight forwarding costs are included, net of purchased transportation cost estimates, under carriers' support activities in the "Other costs" category.

The following definitions from last year's segmentation and definitions have been updated:

IHS Markit data refresh

Air. In response to an observation that the current source for air freight data was showing unusually large growth, a shift was made to the Bureau of Transportation Statistics' T100 data to calculate air freight growth.

Rail. Due to an update in data sources, the rail figures for 2020 and 2021 have been refreshed to now include statistics from BNSF and Norfolk Southern.

Figure A

Three cost categories are used to determine USBLC

Data element	Sub-elements	Source
Transportation costs		
Motor carriers	— Full truckload — Less-than-truckload — Private or dedicated	— BEA input–output accounts, annual, production of commodities by industry — IHS Markit Transearch™
Parcel	— Courier and messenger — USPS parcel segment	— BEA input–output accounts, annual, production of commodities by industry, gross value — IHS Markit — FedEx and UPS financial statements — US Bureau of Transportation, Form 41 Air Carrier Reports — USPS financial statements — USPS Cost Segment and Components Report — Pitney Bowes Shipping Index
Rail	— Carload — Intermodal	— BEA input–output accounts, annual, production of commodities by industry — IHS Markit — Association of American Railroads — Surface Transportation Board
Air freight	— Domestic and import–export cargo and express	— BEA input–output accounts, annual, production of commodities by industry — US Bureau of Transportation, Form 41 Air Carrier Reports — IHS Markit
Water	— Inland — Coastal and Great Lakes — Deep sea: domestic, import–export	— BEA input–output accounts, annual, production of commodities by industry — IHS Markit
Pipeline	— Crude oil — Natural gas — Other products	— BEA input–output accounts, annual, production of commodities by industry — IHS Markit
Inventory carrying costs		
Storage		— BEA input–output accounts, annual, production of commodities by industry — US warehousing and storage gross output from 2011 to 2020
Weighted average cost of capital	— Cost of equity, debt, and taxes	— Aswath Damodaran, New York University Stern School of Business
Total business inventory		— Federal Reserve Bank of St. Louis, Series ID A371RC1Q027SBEA: private inventories, quarterly, seasonally adjusted (from BEA). Private inventories includes manufacturing, retail, and wholesale and represents end-of-month stock and goods available for sale on the last day of the reporting period
Other (obsolescence, shrinkage, insurance, handling, others)	— Shippers' administrative costs	— Kearney estimate based on various internal and external studies — Gartner
Other costs		
Carriers' support activities	— Freight transportation arrangement — Packing and crating — Marine cargo, port, and other shipping-related services — All other support services to transportation	— BEA input–output accounts, annual, production of commodities by industry — Public company financial statements — IHS Markit Business Market Index
Weighted average cost of capital	— Wages — Benefits — IT costs	— BLS, occupational employment statistics, occupation by industry sector — BLS, employer costs for employee compensation, private workers — NYU

Note: USBLC is United States business logistics costs.

Source: Kearney analysis

Parcel market size methodology update

Parcel includes US-based couriers and messengers, as well as the United States Postal Service (USPS) parcel segment, net of purchased transportation. The calculation methodology has been updated through the following changes:

— USPS, UPS, Amazon, and regional carrier revenue figures have been updated to those cited in the Pitney Bowes Shipping Index report for 2017–2022. Pitney Bowes has a proprietary method to balance SurePost across UPS and USPS revenue figures.

— FedEx revenue is based upon FedEx 10-K annual report for 2020–2022, and Pitney Bowes Shipping Index Reports for 2017–2019. FedEx 10-K data is used separately rather than Pitney Bowes due to the fact that SmartPost was replaced prior to 2021.

Inventory carrying cost

Inventory carrying costs are calculated by summing up the three subcomponents: storage, financial costs, and other costs. The calculation of financial costs estimates the weighted average cost of capital for all US public companies and multiplies it by the value of total business inventory. The value for other costs is calculated as a proportion of the overall inventory carrying cost. This proportion is smaller than the other two subsegments and is based on consensus estimates from various sources.

Other costs

We use the same definitions as last year.

Carriers' support activities reflect a broad range of services that support shipping. Examples include freight transportation arrangements (such as for freight forwarders and brokers); customs services, packing, or crating; port handling and other freight yard management; container leasing; navigation services; and related activities. Purchased transportation has been eliminated from this calculation in order to eliminate duplicate counting of freight.

Shippers' administrative costs are built on two specific cost areas: labor and logistics information technology (IT). Labor costs are calculated using a weighted average of mean annual wages for manufacturing, retail, and wholesale industries for logistics-related occupations, plus the estimated value of total benefits paid to employees in addition to wages. The calculation of logistics IT spending is based on industry reports of the US supply chain management software market.

Historical comparisons

To facilitate comparison over time, a historical USBLC 10-year summary has been included (see figure B on page 58). Some government data has been revised or updated, so some figures (including GDP and inventory) may differ from previous reports.

Figure B

Ten-year summary of USBLC

Metric	Units	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Nominal GDP	$ billion	16,784.9	17,521.7	18,219.3	18,707.2	19,543.0	20,527.2	21,381.0	21,060.5	23,315.1	25,462.7
Total business inventory	$ billion	2,395.4	2,524.4	2,520.7	2,536.7	2,637.4	2,800.1	2,888.0	2,840.6	3,200.7	3,708.3
Inventory carrying rate	%	16.6%	15.0%	15.8%	15.5%	15.8%	17.4%	16.1%	13.9%	15.6%	20.5%
Transportation costs	$ billion	830.8	897.2	901.7	897.9	966.6	1,060.4	1,094.1	1,070.5	1,296.0	1,391.4
Inventory carrying costs (ICC)	$ billion	398.8	377.5	397.9	393.2	417.1	487.8	463.6	396.2	499.4	759.3
Other costs	$ billion	82.2	89.4	94.7	100.6	108.6	114.9	124.0	120.0	141.6	166.1
Total USBLC	$ billion	1,311.8	1,364.2	1,394.4	1,391.7	1,492.2	1,663.1	1,681.7	1,586.8	1,937.0	2,316.7
Total USBLC as % of nominal GDP	%	7.8%	7.8%	7.7%	7.4%	7.6%	8.1%	7.9%	7.5%	8.3%	9.1%
Total business inventory as % of nominal GDP	%	14.3%	14.4%	13.8%	13.6%	13.5%	13.6%	13.5%	13.5%	14%	14.6%
Transportation as % of nominal GDP	%	4.9%	5.1%	4.9%	4.8%	4.9%	5.2%	5.1%	5.1%	5.6%	5.5%
ICC as % of nominal GDP	%	2.4%	2.2%	2.2%	2.1%	2.1%	2.4%	2.2%	1.9%	2.1%	3.0%
Total business inventory as % of nominal GDP (2013 = 100)	base 100	100.0	101.0	96.9	95.0	94.6	95.6	94.6	94.5	96.2	102.1
Transportation as % of nominal GDP (2013 = 100)	base 100	100.0	103.5	100.0	97.0	99.6	104.4	103.4	102.7	112.3	110.4
ICC as % of nominal GDP (2013 = 100)	base 100	100.0	90.7	91.9	88.5	89.8	100.0	91.3	79.2	90.1	125.5
Total USBLC as % of nominal GDP (2013 = 100)	base 100	100.0	99.6	97.9	95.2	97.7	103.7	100.6	96.6	106.3	116.4

Note: USBLC is United States business logistics costs.

Source: Kearney analysis

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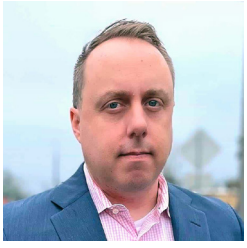

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