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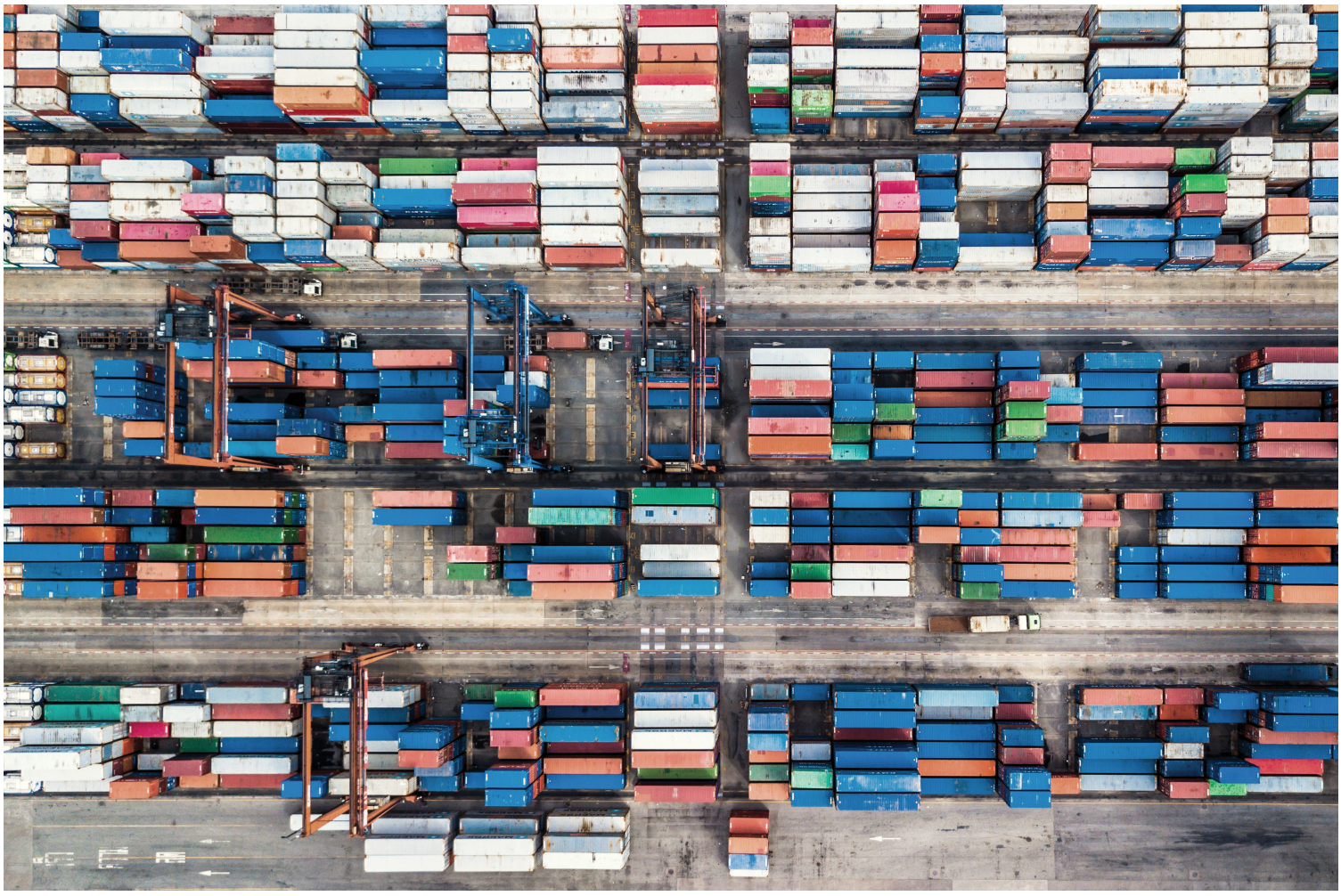
Creating Resilience

Supply Chain Disruptions Create New Opportunities for Industrial & Logistics Real Estate

VIEWPOINT

As suppliers store more inventory and diversify manufacturing sources to counter supply chain disruptions, new industrial markets are emerging worldwide.

CBRE RESEARCH
DECEMBER 2021



Executive Summary

- Disruptions to global supply chains have suppliers scrambling to increase their inventories and expand their warehouse space, creating opportunities for industrial & logistics property owners and investors.
- Strong demand for industrial space is forecast for markets near large population concentrations, as well as seaports, inland ports and major air hubs.
- Product sourcing will expand beyond long-dominant countries like mainland China, as suppliers implement multi-location strategies to mitigate risk and increase inventories in the face of continued supply chain disruptions.
- Industrial demand will shift to different ports of entry as countries of origin change. In the U.S., shifts in product sourcing to South Asia and Europe will benefit East and Gulf Coast ports, especially Charleston, Savannah and Houston. In Europe, the Greek port of Piraeus and the Spanish ports of Algeciras, Barcelona and Valencia are expected to attract more container volume. Alternative port choices in Asia-Pacific include Xiamen, Qingdao, Nansha and Shekou in mainland China and Tanjung Pelepas in Malaysia.
- More nearshoring or reshoring of manufacturing, particularly to Northern Mexico, will help relieve supply disruptions.

More nearshoring or reshoring of manufacturing will help relieve supply chain disruptions.

Overview

The just-in-time paradigm, which allows suppliers to receive goods as close as possible to when they are needed, has been weakened by trade tensions, labor shortages and COVID-related shutdowns.

In response, suppliers are leasing warehouse and distribution space at a record clip to store more inventory while also meeting the needs of a growing online consumer base. Suppliers also are diversifying their manufacturing sources beyond mainland China to other Asian countries like Vietnam, Indonesia and the Philippines, and in some cases reshoring manufacturing to North America and Europe.

The diversification of product sourcing and holding more inventory are creating emerging industrial markets around the world that should be on the radar of industrial & logistics property occupiers, owners and investors.

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Root Causes of Current Supply Chain Disruptions

Asia's major manufacturing hubs were largely shut down earlier this year by the COVID delta variant outbreak this summer, which constrained global supply chains and raised costs.

Figure 1: Asia Manufacturing Hub Delays Due to the Delta Variant

Market	Restrictions	Period
Mainland China	Closure of major ports Yantian and Ningbo.	June - August 2021
Korea	Level 4 (highest) social distancing restrictions at production sites.	July 2021
Japan	State of emergency with tightened mobility rules affecting manufacturing in three major industrial zones: Tokyo-Yokohama, Osaka-Kobe and Chukyo.	July - October 2021
India	Lockdown and curfews in major cities. Half of production hub Maharashtra's manufacturing capacity suspended.	April - June 2021
Malaysia	Major semiconductor facilities were required to operate under reduced capacity during the national lockdown.	June - October 2021
Vietnam	Strict lockdown measures temporarily shut the manufacturing plants of several global electronics and apparel/footwear brands. However, the impact has eased after factories gradually resumed production capacity beginning in October.	July - October 2021

Source: CBRE Research, October 2021.

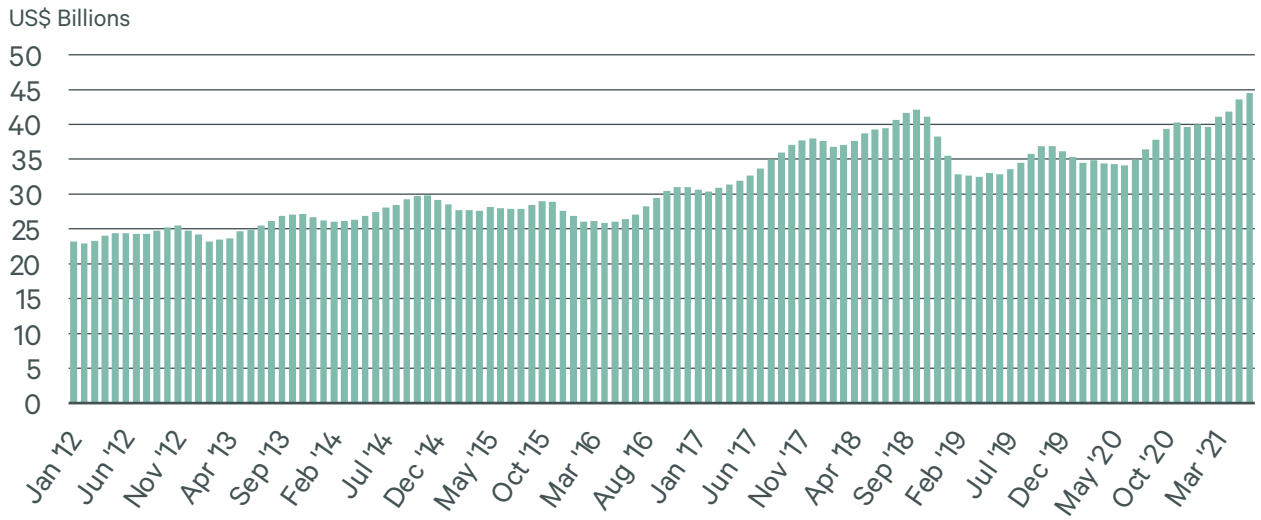
Continued COVID-related disruptions have caused instability in the supply of key materials and components for global industrial production, particularly for semiconductors. Global semiconductor sales are growing due to the rise in remote health care and virtual work and learning. CNBC reports that the shortage of key semiconductor components is estimated to last at least until 2023.

Global automakers have been acutely affected by the semiconductor shortage. After attempting to resume normal production levels this year, they cut production by 2.3 million vehicles in Q2 and Q3 2021 combined, according to the Financial Times. The toy and personal electronics industries have also been negatively impacted by chip shortages in the run-up to the holiday season.

Global semiconductor sales are growing due to the rise in remote health care and virtual work and learning.

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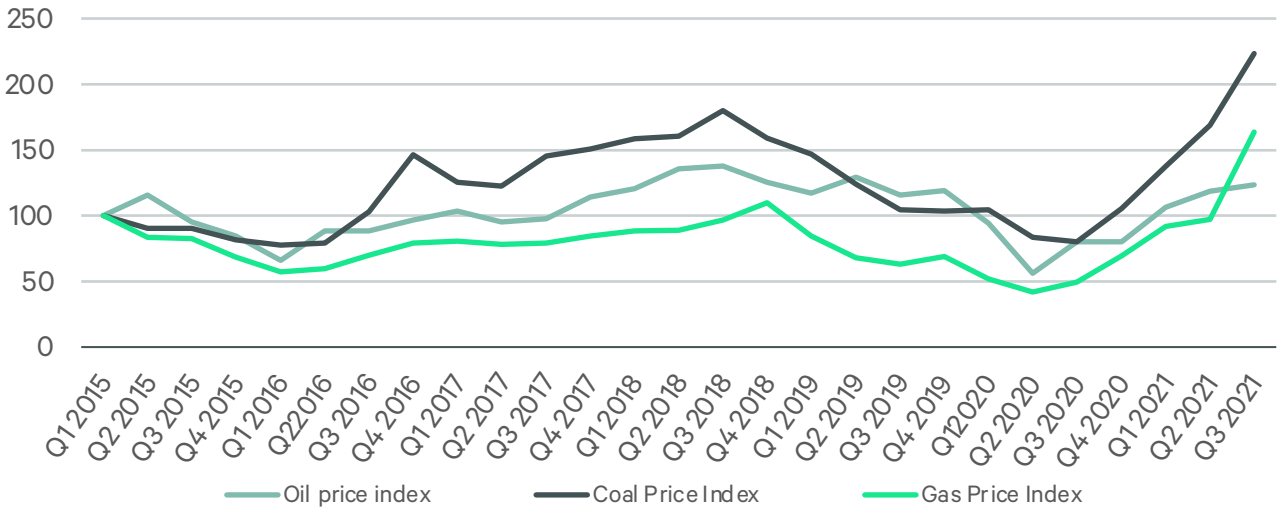
Figure 2: Global Semiconductor Sales by Month 2012-2021



Source: Statistica.com, May 2021.

The volatility of global energy markets also is roiling supply chains. Coal, crude oil and natural gas prices have surged this year. For example, coal future trading volume on the Intercontinental and New York Mercantile exchanges grew by 197% year-to-date as of early October. Shortages in coal, gas and oil supplies also are adversely affecting supply chains from major Asian economies that rely heavily on them for industrial power supply, particularly mainland China and India. For example, power usage in mainland China was restricted in late September in the major industrial provinces of Guangdong, Liaoning and Jiangsu.

Figure 3: Global Commodity Price Index



Source: Oxford Economics, Q3 2021.

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Transportation & Labor Challenges

Major retailers are expecting a strong holiday shopping season but have warned of limited inventories due to the gridlock at global ports. The supply shortages could negatively affect holiday sales, erode corporate profits and contribute to higher consumer prices. Retailers have advised consumers to place on-line holiday orders early in hopes of receiving them before Christmas.

As of mid-October, 107 container ships were waiting to onload at the ports of Hong Kong and Shenzhen, while up to 100 were waiting at the ports of Los Angeles and Long Beach. RBC Capital Markets reports that 77% of the world's 22 largest ports are currently experiencing delays.

While the ports of Los Angeles and Long Beach have attempted to extend their operations to 24 hours per day, seven days per week to alleviate the backup, finding available labor to keep the ports at full production has been extremely difficult. Labor shortages are also are limiting operations of railyards, manufacturing plants, warehouses and trucking companies.

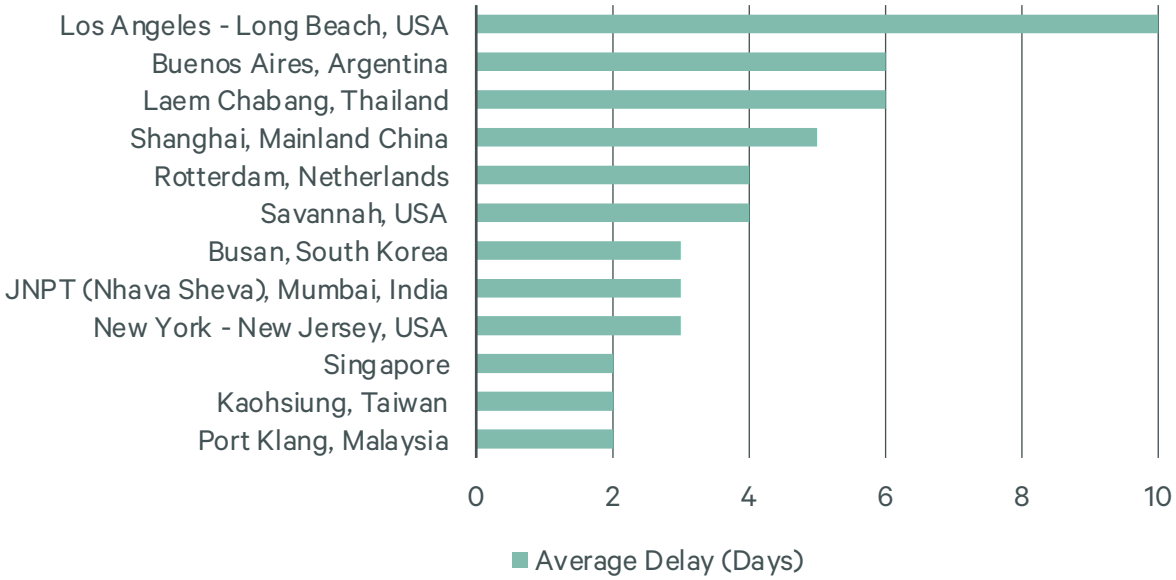
Percentage of 22 of the world's largest ports experiencing delays

77%

Hours of operation extended for the ports of LA and Long Beach

24/7

Figure 4: Global Port Performance - Average Delay Time in Days



Source: Go Comet, October 2021.

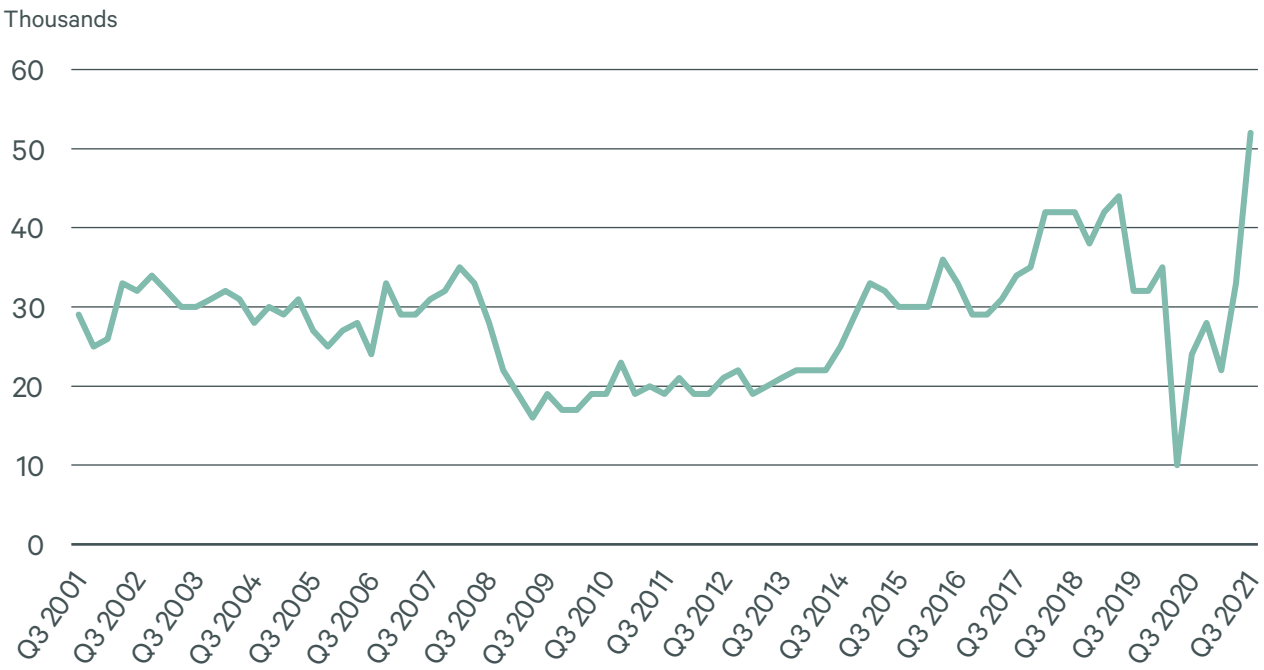
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Labor shortages are also affecting warehouse, manufacturing and port operations. The U.K. has seen a big drop in workers from EU countries who it relies on for certain logistics operations. The number of Romanian and Bulgarian logistics and food production workers in the U.K. plunged by almost 90,000 or 24%, since the end of 2019. Employees from eight Eastern European countries, including Poland and the Czech Republic, have fallen by more than 100,000 or 12%. In response, major retailers have been offering signing bonuses of up to £3,500 to attract new seasonal staff ahead of the busy holiday season.

With the pandemic intensifying labor shortages across the supply chain, many companies are upping employee wages and other benefits. A major Chinese e-commerce company plans to increase remuneration for front-line delivery staff by 14% over the next two years, while major third-party logistics companies (3PLs) have allocated millions of U.S. dollars in additional salary for their warehouse employees.

With the pandemic intensifying labor shortages across the supply chain, many companies are upping employee wages and other benefits.

Figure 5: U.K. Transport & Storage Job Vacancies



Source: Office for National Statistics, October 2021.

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The extensive delays and materials shortages have increased transportation costs and inflation. The cost of shipping a 40-foot container by sea from Shanghai to the Port of New York/New Jersey increased by 154% year-over-year in 2021 to $12,718, according to Drewry Supply Chain Advisors. The cost to ship a container from Shanghai to the Port of Los Angeles increased by 145% to $9,947, while the cost from Shanghai to Rotterdam rose by a whopping 498% to $13,801.

Percentage increase to ship a container from Shanghai to LA

145%

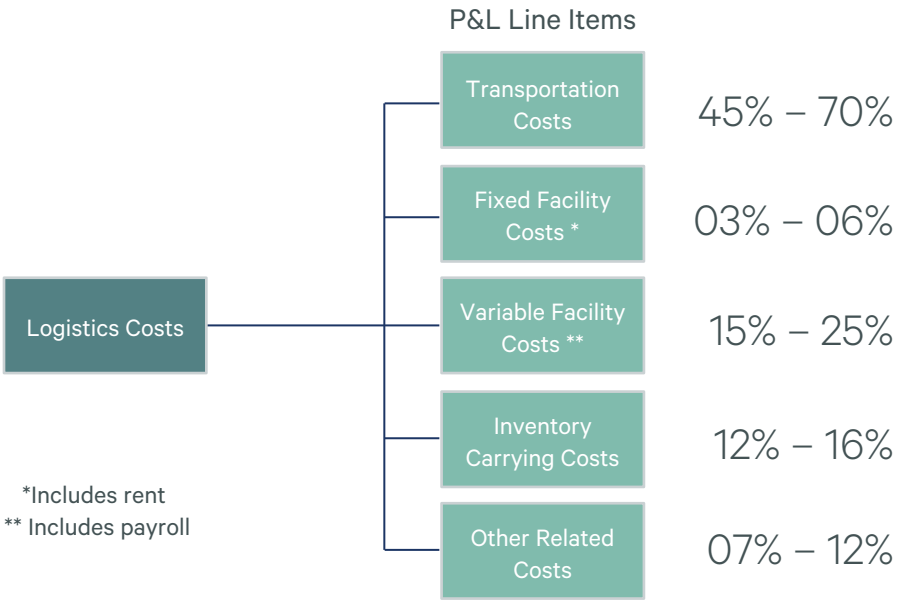
Shipping by air remains a much more expensive option. The average rate for international air cargo, which includes passenger and cargo flights, is up by 14% year-over-year in 2021, according to Clive Data Services. Domestic shipping also remains expensive due to increases in demand and fuel prices. The Cass Freight Index for U.S. domestic freight (air, rail and truck) has increased by more than 20% since September 2020.

Percentage increase for U.S. domestic freight (air, rail, truck)

20%

CBRE Supply Chain Advisory reports that transportation costs typically account for 50% to 70% of a company's total logistics spend, while fixed facility costs (including real estate) account for only 3% to 6%. CBRE estimates that it takes roughly an 8% increase in fixed facility costs to equal the impact of just a 1% increase in transportation costs. Based on this formula, it appears that increasing inventories by adding more warehouse and distribution space could significantly reduce transportation costs for many shippers.

Figure 6: Anatomy of a Company's Logistics Spend



Source: CBRE Supply Chain Advisory, 2021.

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Supply Chain Remedies

Holding more inventory will be key to avoiding supply chain disruptions. Approximately one-third of respondents to CBRE's EMEA 2021 Logistics Occupier Survey indicated a preference for this approach. Suppliers will prefer to hold more inventory near large population concentrations, as well as seaports, inland ports and major air hubs.

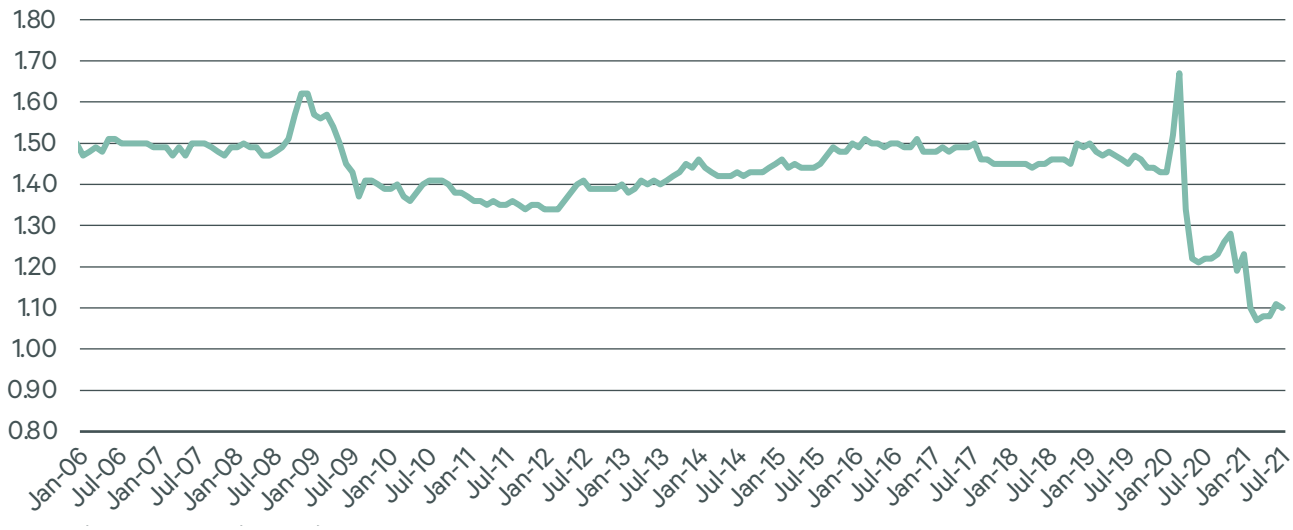
Diversification of product sourcing from various countries also will be crucial to avoid supply chain disruptions. Indeed, many suppliers and manufacturers are adopting "China Plus One" strategies, with Asian emerging economies like Vietnam, Indonesia and the Philippines at the top of their list.

Industrial demand will shift to different ports of entry as supply chain sources expand. In the U.S., shifts in manufacturing to other parts of Asia or Europe could benefit East and Gulf Coast ports, especially Charleston, Savannah and Houston. In Europe, the Greek port of Piraeus and Spanish ports of Algeciras, Barcelona and Valencia are expected to attract more container volume as production is diversified. Certain ports in mainland China like Xiamen, Qingdao, Nansha and Shekou could help alleviate congestion in gateway ports like Ningbo, Shanghai and Yantian. In the long run, ports in Southeast Asia will generally see higher volume due to global manufacturers' diversification of suppliers beyond those in mainland China.

Nearshoring or reshoring of manufacturing also will be used to avoid supply chain disruptions. In Europe, manufacturing could move to Central and Eastern European (CEE) countries, such as Poland. CEE countries are competitive with Asia-Pacific countries for real estate and labor costs. CEE average labor costs are around one-third of those in Western Europe, according to Global Trade Review.

Production of semiconductors and other technology components, automobiles and parts, medical supplies and pharmaceuticals will be prevalent in U.S. nearshoring. While traditional manufacturing centers in the U.S. Northeast and Midwest will benefit, so will markets with growing populations and pro-business environments like Arizona, Texas, Alabama, South Carolina and Florida.

Figure 7: U.S. Inventory to Sales Ratio



Source: Federal Reserve Economic Data, August 2021.

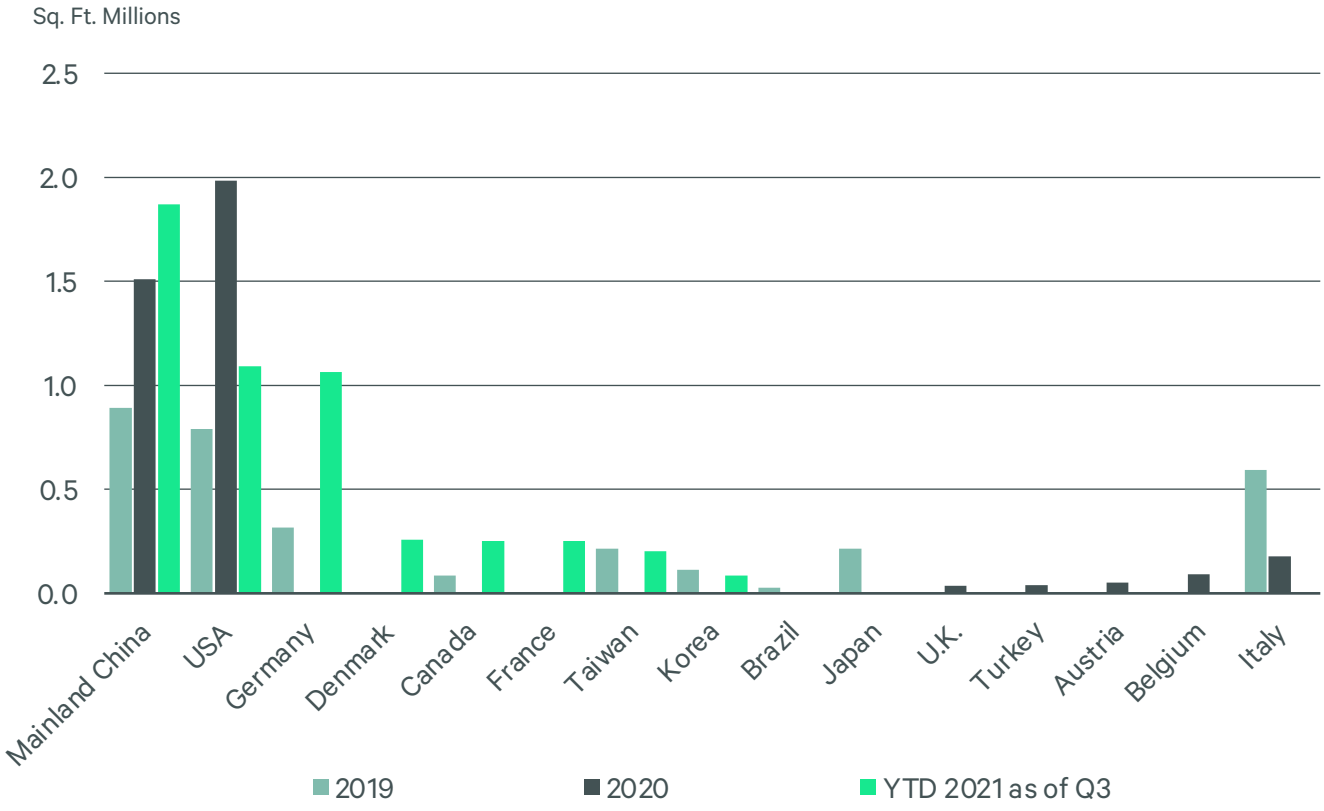
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Mexico is already seeing the benefit of nearshoring, which accounted for 13% of total industrial space absorption year-to-date through Q3 from 8% in 2019. Year-to-date through Q3, total gross absorption of industrial space in Mexico surpassed all of 2020, largely from auto manufacturers, home appliance makers and machinery & tool manufacturers.

Percentage of total industrial space absorption year-to-date through Q3 from nearshoring in Mexico

13%

Figure 8: Mexico Gross Absorption from Nearshoring



Source: CBRE Research, Q3 2021.

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Industrial Real Estate Outlook

Supply chain shifts and consumers' continued preference for e-commerce will be major factors in global demand for industrial space next year. New ports of entry and increases in domestic inventories will shift some demand to emerging industrial markets in the following regions.

Figure 9: Global Industrial Real Estate Fundamentals, Q3 2021

North America	
YTD Overall Net Absorption (Million Sq. Ft.)	366.4
Year-Over-Year Rental Rate Growth	10.4%
Investment Sales Volume	US$97.2 Billion

Europe	
YTD Overall Net Absorption (Million Sq. Ft.)	248.2
Year-Over-Year Rental Rate Growth	4.80%
Investment Sales Volume	€38.7 Billion

Asia Pacific	
YTD Overall Net Absorption (Million Sq. Ft.)	63.7
Year-Over-Year Rental Rate Growth	3.0%
Investment Sales Volume	US$23.7 Billion

Source: CBRE Research, Real Capital Analytics, Q3 2021.

North American year-over-year rental rate growth

10.4%

European YTD net absorption

248M Sq. Ft.

APAC investment sales volume

US$ 24B

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Europe

The nearshoring trend will cause a shift to manufacturing and distribution in emerging European markets, as shippers and manufacturers seek to diversify their sourcing of goods in Asia and cut down on skyrocketing transportation costs. Bringing manufacturing closer to home also allows for more efficient communication with factories due to reduced time zone differences and traveling times to monitor production progress.

The following three emerging European markets are showing the most promise to capitalize on these trends.

Poland

With borders between Germany and six CEE countries, as well as affordable labor costs, Poland is a strong candidate for global companies to establish manufacturing and distribution facilities. Some major North American companies already have based their European manufacturing and distribution hubs in Poland.

The ports of Gdansk and Gdynia are well equipped to handle container traffic through the Baltic Sea and rank first and third, respectively, for total containerized cargo among Baltic ports. Furthermore, approximately 90% of rail freight to Europe from mainland China passes through the Polish terminal in Malaszewicze, making it a key part of the New Silk Road. A new terminal to quadruple Malaszewicze's capacity is scheduled for completion by 2028.

Percentage of rail freight from mainland China to Europe passing through Malaszewicze, Poland

90%

Mediterranean Ports of Spain and Greece

The traditional European ports of Antwerp, Bremerhaven, Hamburg and Rotterdam together handle approximately half of all containerized cargo in Europe. Shippers are seeking alternatives to these ports due to congestion and different points of product origin. The Spanish ports of Algeciras, Barcelona and Valencia are likely candidates. Spain offers higher labor availability than most other Western European countries and its accessibility through the Suez Canal makes it a compelling port of entry for goods from Asia.

Piraeus, Greece has in recent years emerged as the top port in the Mediterranean. Goods from Asia are typically reloaded for transport to other Mediterranean ports or transported by rail across the Balkans into Central and Eastern Europe. The growing importance of the port has led to heightened demand for logistics space in nearby Athens.

Percentage of European containerized cargo handled by Antwerp, Bermerhaven, Hamburg and Rotterdam

50%

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Turkey

Turkey has emerged as a strong candidate for European retailers to diversify their manufacturing base beyond the Far East. The country is the seventh largest global exporter of textiles and apparel by value. Turkish manufacturers are known for flexibility, with an ability to produce small quantities of goods in limited runs and larger amounts of product on longer-term contracts. European clothing retailers are in talks with Turkish factories, as an ongoing energy crisis has delayed production in mainland China. This, along with skyrocketing shipping costs, will prompt retailers to shift at least part of their manufacturing to Turkey, benefiting its industrial markets.

Global ranking for Turkey in the exportation of textiles and apparel by value

7

Asia-Pacific

Approximately 78% of respondents to CBRE's 2021 Asia Pacific Logistics Occupier Survey say they will increase their industrial space across the region in the next three years, particularly for warehouse space in high-consumption markets.

Percentage of logistics occupier survey respondents who say they will increase industrial space across the APAC region

78%

Southeast Asia and India are among the top target markets for both manufacturing and logistics occupiers. Their fast-growing consumer bases will attract more manufacturers while serving as a cost-effective option for risk diversification.

The following three countries are capitalizing on these trends.

Vietnam

Benefiting from the production and sourcing diversification of global manufacturers, Vietnam has seen surging demand for factories and warehouses in recent years. Although Vietnam's manufacturing sector was hit by the recent COVID-19 resurgence, the country's registered foreign direct investment (FDI) still reached approximately US$22 billion in the first three quarters of 2021, up by 4.4% from the same period a year ago. More than half of that investment was in the manufacturing sector. With mobility restrictions gradually lifted, more than 60% of manufacturing companies in Ho Chi Minh City had resumed operation by mid-October. Improved infrastructure, a favorable foreign direct investment policy and a strong labor base will continue to attract global producers to Vietnam.

Percentage of manufacturing companies which have resumed operation as of October 2021

60%

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India

Mobility restrictions from the COVID delta variant in H1 2021 led to strong demand for warehouse space in India, as companies increasingly expanded their logistics networks for e-commerce deliveries to the country's large population and across its broad geographic range. Industrial & logistics leasing activity in 2021 has quadrupled from a year ago and is expected to grow further next year.

Emerging Advanced Manufacturing Hubs in Mainland China

The transformation of mainland China's manufacturing base to advanced production industries is expected to benefit industrial real estate in emerging manufacturing hubs along mainland China's mega industrial zones of the Yangtze River Delta (Eastern China), Bohai Rim (Northern China), Greater Bay Area (Southern China) and Chengdu-Chongqing (Western China). Investments in the advanced manufacturing sector in mainland China increased by nearly 30% year-over-year in H1 2021. These regions are already seeing robust industrial development, enhanced research & development infrastructure and strong labor availability.

North America

Supply chain diversification, reshoring of manufacturing and holding more inventory will lead to greater demand for industrial real estate. With record-low vacancy rates and record-high rents, more companies will outsource distribution to 3PL providers next year. Demand will be greatest in logistics hubs that can reach large population concentrations with lower transportation costs. American, Canadian and Mexican industrial markets are all experiencing strong fundamentals in vacancy rates, transaction volume, rental rate growth and development.

While many markets will benefit from companies' new supply chain strategies, the following three will stand out in the coming year.

Greenville-Spartanburg

Greenville-Spartanburg (GSP), an upcoming transportation and manufacturing juggernaut, will head the list for companies seeking to store more inventory. GSP is centrally located between Atlanta and Charlotte, two of the fastest growing metropolitan areas in the region. A wide range of upstate manufacturers—especially automotive, advanced materials and aerospace—provides a diverse economy and drives demand for distribution space. Ports within the GSP market are a primary driver for distribution center demand due to cost savings, supply chain mitigation and efficiency. The Port of Charleston provides overnight service to Inland Port Greer, allowing companies to quickly get products in and out of regional distribution centers.

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Louisville

Louisville's Muhammad Ali International Airport is the world's fourth busiest air cargo hub, according to Airport Councils International. Ali International is home to UPS Worldport, one of the largest package-handling facilities in the world. Nearly 30 million people live within 250 miles of the market and there are five major auto assembly plants within 120 miles that create significant demand for light-manufacturing and assembly space. Louisville serves a large population base as a major transportation hub that is close to a growing manufacturing industry. These attributes will drive demand from companies looking for supply-source protection next year.

Population within 250 miles of Louisville

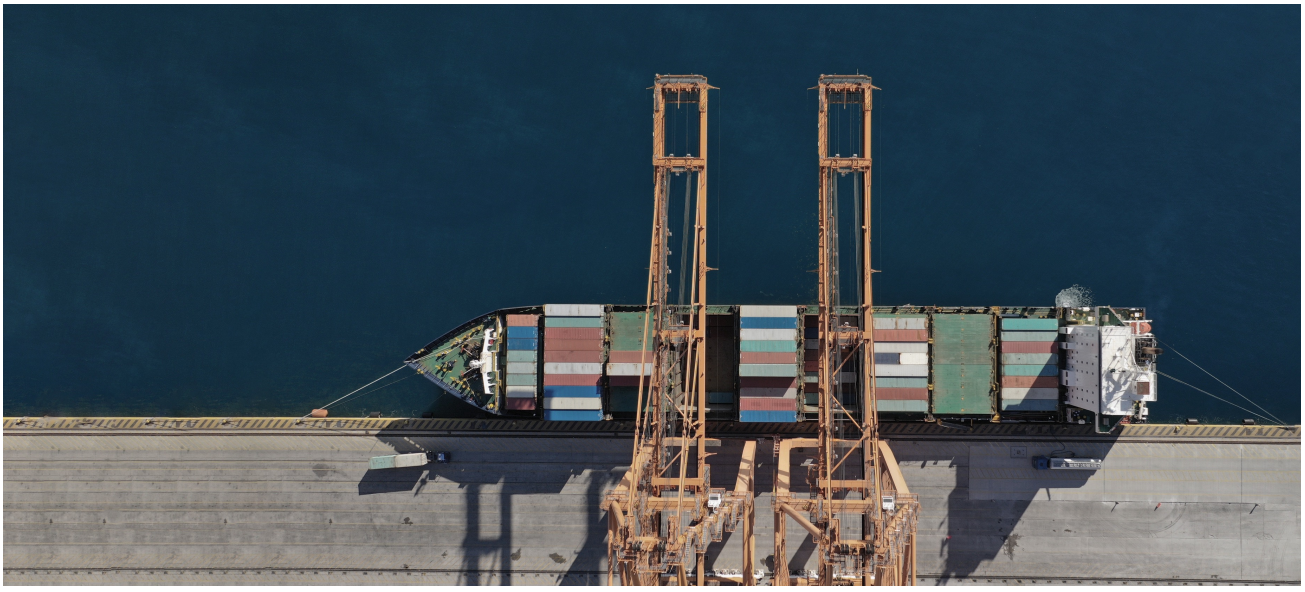
30 Million

Monterrey, Mexico

Monterrey is considered the most diversified industrial hub in Mexico and is a viable onshoring option for companies looking to diversify their supply sourcing. Monterrey accounted for 52% of total industrial space absorption by industries reshoring to Mexico last year. There are three important factors driving this demand: the wide availability of specialized labor, plenty of available land for development with infrastructure already in place and robust export levels to the U.S.

Monterrey's percentage of total industrial space absorption by industries reshoring to Mexico last year

52%



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