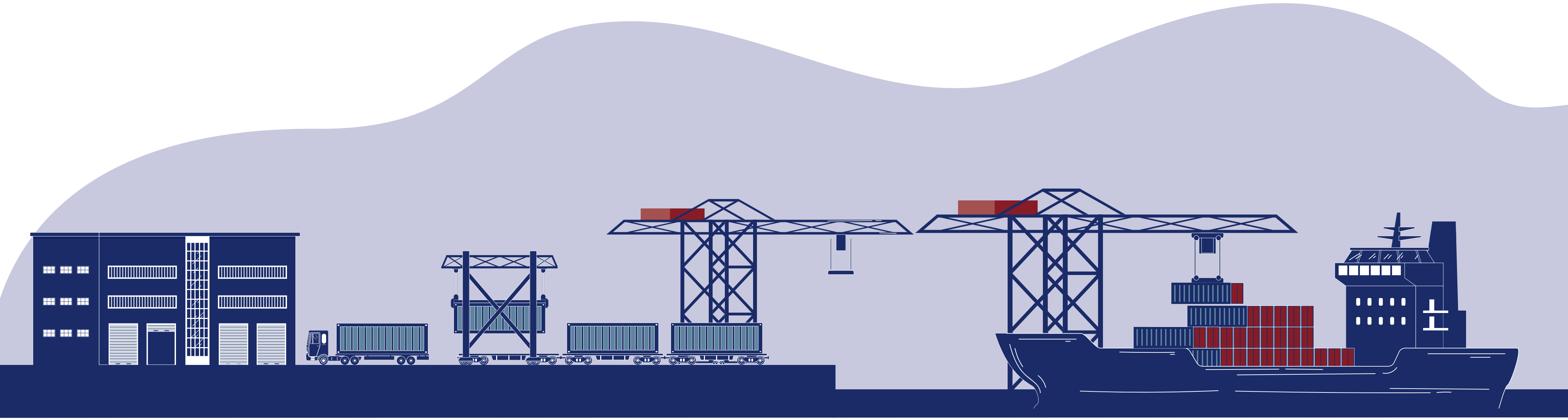
Partners Group
REALIZING POTENTIAL IN PRIVATE MARKETS

Reinventing supply chains



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Partners Group is a leading global private markets firm. Since 1996, the firm has invested USD 185 billion in private equity, private real estate, private debt, and private infrastructure on behalf of its clients globally. Partners Group seeks to generate strong returns through capitalizing on thematic growth trends and transforming attractive businesses and assets into market leaders. The firm is a committed, responsible investor and aims to create sustainable returns with lasting, positive impact for all its stakeholders. With USD 131 billion in assets under management as of 30 June 2022, Partners Group provides an innovative range of bespoke client solutions to institutional investors, sovereign wealth funds, family offices and private individuals globally. The firm employs more than 1,600 diverse professionals across 20 offices worldwide and has regional headquarters in Baar-Zug, Switzerland; Denver, USA; and Singapore. It has been listed on the SIX Swiss Exchange since 2006 (symbol: PGHN).

Reinventing supply chains

Private market asset classes have a critical role to play in creating the resilient and sustainable supply chains of tomorrow

The scale and speed of the pandemic's impact on global supply chains eclipsed anything that had been seen before. COVID brought the entire global value chain to a shuddering halt, beginning, of course, with the world's factory, China, which contributed almost 29% of all global manufacturing in the year preceding the pandemic.[1]

Above all, the unprecedented scope of supply chain disruption has revealed the fundamental fragility of the global, just-in-time model that has evolved over the past decade, as supply chain management has grown in sophistication and as e-commerce penetration has risen exponentially.

The situation has been exacerbated by a punishingly tight labor market. COVID led to the loss of 114 million jobs in 2020 alone and employers have struggled to rebuild that talent pool in the face of an ageing population, the so-called 'Great Resignation' and shifting workers' demands.

The shortage has been felt particularly acutely in sectors that are critical to the flow of goods and products, including manufacturing and logistics. Almost 20% of trucking jobs went unfilled across 20 Eurasia countries in 2021, while the US has reported a labor shortage of 80,000 truck drivers.[2]

Just when some normality appeared to be returning, Russia's invasion of Ukraine placed further pressure on global supply chains. Russia's dominant role in global energy, industrial metals and agricultural commodities has pushed commodity price inflation to its highest levels in more than 50 years.

Meanwhile, geopolitical tensions brewing between the US and China are creating new areas of risk, not least around indispensable semiconductor chips, an overwhelming 63% of which are manufactured in Taiwan – rising to 90% for advanced chips.[3] Any potential military action or blockade in the region would have yet more devastating implications for supply chains.

Reinvention

The events of the past three years have created impetus behind a reinvention of global supply chains, with a greater emphasis on diversification, and on local and regional supply chain networks.

In the medium term, companies have shifted emphasis towards a more localized distribution network and sought out local supplier alternatives. Indeed, businesses have often proved willing to pay more in return for security of supply and the ability to ensure their own customers' loyalty. Some businesses, including our portfolio company DiversiTech, an HVAC components business, were also quick to ramp up onshore production, investing in new manufacturing capacity in the US.

Longer term, the concept of nearshoring is certainly rising in prominence. That is not to say that we will see a complete reversal of globalization, of course, but the severity of COVID's impact on supply chains, coupled with ongoing geopolitical unrest, mean production by the market, for the market, is coming to the fore.

The global decarbonization agenda is also playing a role, creating additional momentum behind the transformation from long-chain production to short-chain, bolstered by an awareness that climate change-related supply chain issues are not going away, with extreme weather events continuing to drive disruptions and resource scarcity.

But nearshoring comes with cost implications, of course. And moving production away from low labor cost regions will increase the focus on automation. The willingness of customers to contribute to the capital expenditure involved in the relocation and process upgrades will depend on the mission-critical nature of the industries involved.

The private markets' response

Supply chain disruption has caused challenges for many businesses, including those backed by private capital. But, crucially, the financial and operational support afforded by private markets firms has allowed these assets to respond with the necessary foresight and agility to navigate these capricious times.

At Partners Group, we have worked closely with our portfolio companies to try to ensure continued access to both suppliers and customers; to help manage inflating costs; implement technology-based solutions to drive efficiency; and build market share through one of the most turbulent periods in history.

We also remain laser-focused on long-term value creation and are positioning our assets for long-term supply chain resilience and sustainable growth through the cycles.

We have also identified pockets of new investment opportunity against this tumultuous backdrop, ranging from logistics services businesses, and last- and first-mile logistics real estate, to those supplying components to a semiconductor industry in flux.

A confluence of forces majeure has undoubtedly created extreme short-term volatility, but it has also created impetus for long-term change. Private markets managers are ideally positioned to ensure assets are prepared to take advantage of both.

[1] United Nations, 2020.

[2] The International Road Transport Union, Driver Shortage Global Report, June 2022.

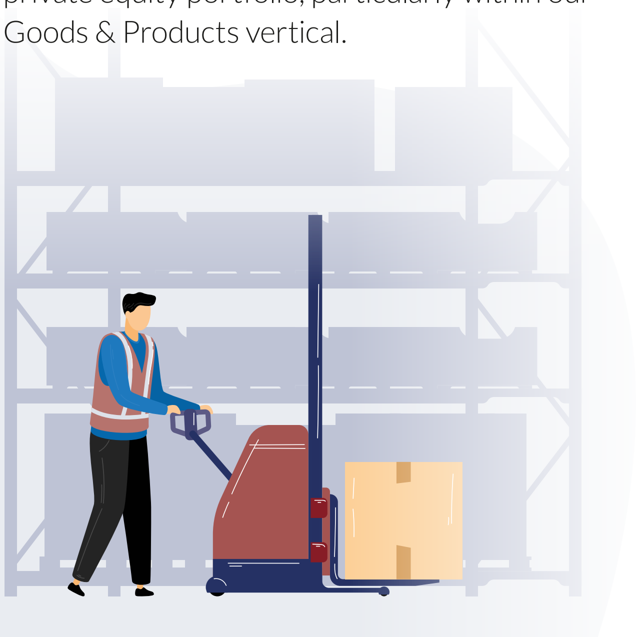
[3] Boston Consulting Group, April 2021.

Private equity

The disruption opportunity

Private equity ownership can help businesses respond to short-term supply chain pressures and position themselves for long-term success

Supply chain disruption has had a profound impact on businesses with complex international operations, importing raw materials and exporting finished products. Its impacts have been felt in some way across almost all the sectors in our private equity portfolio, particularly within our Goods & Products vertical.



As illustrated by some of the examples below, navigating this disruption has required ingenuity, flexibility and a willingness to respond at speed, whilst also having an eye on long-term value creation and resilience. And while there have been some challenges to overcome, supply chain disruption has also created opportunity, and we have identified a number of areas of particular interest supported by long-term growth trends.

Overcoming challenges

COVID-19 exposed fundamental vulnerabilities in the lengthy and complex supply chains that have developed with years of progressive globalization. Starting with the onset of the pandemic, shipping times and costs have risen exponentially, particularly out of China, where zero-COVID policies would lead to unpredictable shutdowns. At the sharp end of the crisis, our entrepreneurial ownership model enabled us to trigger several immediate actions across our portfolio to respond to some of the short-term challenges generated by the pandemic.

"We worked closely with the companies in our private equity portfolio to build up inventory in order to bridge those challenging periods," says Ralph Schuck, Managing Director, Private Equity Goods & Products. "We also analyzed pricing power to inform pricing strategy. And while we already focus on buying businesses with strong market positions, we worked alongside these assets to ensure that a high percentage of inflated input costs were passed through."

In the long term, however, pricing power alone cannot drive performance. Thanks to our careful asset selection and entrepreneurial ownership model, we have not only been able to overcome short-term challenges but also work on defined must-win-battles with our portfolio companies to position them for long-term success.

"We are now working with portfolio companies to identify alternative sources of supply, to reduce concentration risk and increase bargaining power," Schuck explains. "Depending on the industry, this is not an overnight fix. But it is clear that supply chain diversification is paramount for ensuring resilience."

For example, at portfolio company Schleich, a leading international provider of figurines and playsets, we have been working on improving the supplier network and footprint to tackle increased shipping costs and supplier delays. We have leveraged our relationship with global transport and logistics company Kuehne+Nagel to bolster Schleich's shipping and transport needs and made specific additions to the company's board in this area.

Nearshoring is also increasingly being discussed as a long-term option for several of our portfolio companies, with some of these discussions even predating the pandemic. The challenge, of course, is the associated increase in cost.

Mac Gwozdz

The CEO view: Ammega Group

Mac Gwozdz, CEO of industrial belting business Ammega Group, a Partners Group portfolio company, says that when supply chain disruption hit, it was vital to respond with speed. "On one hand, we had to ensure we served existing customers without interruptions. On the other, we were faced with opportunities to gain new customers and access new market segments, through superior performance."

Ammega forms a vital part of the global supply chain, supplying belts to airports and logistics operators, as well as food manufacturers. That superior performance has been paramount during this period. As a result, in addition to providing products, the company has also focused heavily on its service function.

> "Suppliers will serve those customers who are the most proactive in getting what they need."

"Ensuring our infrastructure is performing is critical. If something goes wrong, we need to be there within hours to address any downtime. Having competent people on the ground in multiple countries enables us to get experts on site," explains Gwozdz. "This is important in markets such as the US, which are experiencing skilled labor shortages. We are no longer just suppliers of components. We are solution suppliers."

To ensure it could seamlessly continue to deliver these solutions, when COVID struck, Ammega formed a dedicated crisis team, staffed by individuals with experience in demanding industries, such as automotive, where close cooperation between regions is essential. "In an environment such as this, with a lot of forces majeure, you need to be the fastest and the most determined, because suppliers will serve those customers who are the most proactive in getting what they need."

Ammega serves close to 100,000 customers globally and has manufacturing locations in Europe, the US, China and India, so its supply chain is complex. With our support, the company has increased its US manufacturing capacity over the past three years, in order to reduce dependence on intercontinental freight, create local jobs, and improve its carbon footprint. "Through investment in nearshoring, we are decreasing dependence on last-mile delivery, while continuing to ship between the regions when we see the pricing opportunities," Gwozdz says.

Meanwhile, Ammega also relies on petrochemical derivatives for its inputs, which means shipping raw materials between regions. However, the company has succeeded in managing this supply chain without significant disruption. "Uniquely to market, we have not experienced a single major outage. We didn't stop production once through lack of raw materials, which I consider a success."

Gwozdz attributes this success to private equity ownership, which has given Ammega an edge during this volatile period. "A strong balance sheet has been critical, in order to ensure safety stocks of key constrained materials," he says. "Supply chain lead times also require more working capital to safeguard customer deliveries. Sharing best practices and insight around market trends and intelligence across portfolio companies has helped to focus our efforts."

Automation will have an important role to play in mitigating that additional expense, allowing manufacturers currently operating in areas with low labor costs to become less dependent on those geographies.

The nature of the product being produced often determines how much customers are willing to contribute to the cost of nearshoring. "If a manufacturer is producing a component that is mission-critical to its customer's value chain, they are more likely to be prepared to share in the higher cost load," says Schuck.

Another example is our portfolio company Ammega, a conveyor belting business with an international customer base. Ammega made a substantial investment in four US manufacturing sites at the beginning of COVID, before supply chain disruption really took hold. The rationale was to differentiate the business from its competitors in terms of product availability. Customers in this sector value short lead times and the decision to be a nearshoring first-mover has seen it build market share.

Meanwhile, at portfolio company DiversiTech, a leading US HVAC parts manufacturer and supplier, we have worked to expand manufacturing capacity and identify alternative sources of supply in response to soaring demand for its products, which have created significant pressures along its supply chain.

Finding opportunity

While supply chain disruption has caused challenges in the short term, it has also opened up significant new investment opportunities, particularly in the field of logistics and industrial automation. Indeed, private equity firms invested USD 50.6 billion into logistics businesses in 2021, more than three times the previous year and 34% up on 2019, which was an annual record at the time.[4]

One area where we are seeing opportunities is in the asset-light logistics services industry. The sector is supported by robust fundamentals driven by the growth in e-commerce, which has further accelerated following the pandemic. Asset-light business models do not own their own carriers or warehouses, which allows them to have low capex levels, which in turn makes them more resilient during economic downturns.

In 2021, for example, we invested in Apex Logistics, a business headquartered in Hong Kong and Shanghai that operates in the growing cross-border air and ocean freight forwarding market, with a specific focus on the transpacific and intra-Asia trade routes.

> **"Private equity firms invested USD 50.6 billion into logistics businesses in 2021, more than three times the previous year and 34% up on 2019, which was an annual record at the time."**

"As a logistics partner for many blue-chip multinational companies, Apex has benefited enormously from ongoing shifts in global supply chains," says Melody Xu, Member of the Management, Private Equity Asia. "Growth has partly been driven by rising logistics costs, of course. But the business has also differentiated itself by displaying agility and entrepreneurialism that has allowed it to deliver goods on time, resulting in a significant increase in market share."

Apex has also been able to support several businesses in our broader portfolio that have encountered challenges shifting goods in and out of China, including Chinese retail display solution provider BCR Group and US HVAC component provider DiversiTech.

Besides logistics services, another theme that is benefiting from shifts in supply chains is warehouse automation. Supply chain disruptions are forcing companies across a broad range of industries to expand warehouse space in order to increase inventory and manage customer delays. In some cases, companies are even having to store the same inventory in multiple locations to preserve flexibility. In parallel, nearshoring is gaining strong traction but also means that businesses are faced with rising labor costs and labor shortages.

Andy Bergdoll

The CEO view: DiversiTech

Partners Group portfolio company DiversiTech supplies parts and accessories to the heating, ventilation and air conditioning (HVAC) industry. It sells primarily through wholesale distributors, which then sell to installation contractors, which in turn sell to homeowners. It has around 30,000 stock keeping units across six product families.

According to CEO Andy Bergdoll, the HVAC industry experienced a brief downturn early in the pandemic but the sudden transition to working from home meant extra wear and tear on residential HVAC systems that needed to be serviced with DiversiTech products.

At the same time, there was a surge in home renovation projects, which also generated additional demand for DiversiTech products.

"We were categorized as an essential business, so we implemented measures to protect our employees and continued to operate at full steam. Unfortunately, constraints in material supply and logistics, and eventually labor availability, limited our ability to ramp up in response to the demand. Because of this, we went into backorder on many of our product lines in mid-2020 and have spent the past two years on supply chain crisis management."

A key part of DiversiTech's value proposition to its customers is the mitigation of supply chain risk that is afforded by consolidating purchasing with the company. "Installations can't go ahead without some of the components we provide, so going on back order was a real challenge for us."

Supported by Partners Group, DiversiTech has responded to this challenge by expanding capacity in its own manufacturing plants and developing alternative sources of supply for much of its supply chain.

In addition, the company has developed systems to proactively communicate lead times and order status with its customers. "We used the supply chain disruption as an opportunity to get closer to our customers, understand their real-time priorities and develop solutions for them," Bergdoll explains.

Because DiversiTech has historically shipped from inventory rather than build-to-order, it also had to develop new planning systems to schedule production out several months rather than running production to meeting inventory targets. "This is something that was new to us and required technology and processes to be implemented."

In addition to getting closer to its customers, DiversiTech also had to get closer to its suppliers. In some cases, the company pre-bought raw materials to secure supply and in other cases it developed domestic alternatives to Asian suppliers, although at a higher cost, in order to respond more rapidly to demand fluctuations.

"We held a supplier summit in September last year, bringing together our top 25 suppliers, to talk about business planning for 2023, as well as processes and our expectations of them," says Bergdoll. "That is not something we have done before."

Meanwhile, although inbound freight prices and lead times are beginning to ease, Bergdoll sees further challenges on the horizon. In particular, he points to strike plans at West Coast ports, which are creating more short-term congestion on the East Coast as freight is diverted.

A longer term concern for Bergdoll, however, involves labor market constraints. Tight labor markets have, of course, only intensified focus >

The CEO view: DiversiTech (continued)

> on automation and this is an area where Partners Group's operational expertise has proved particularly valuable, according to Bergdoll. "We need to drive efficiencies in our manufacturing plants and distribution centers and Partners Group has been a massive support," he says.

"We have two Partners Group experts dedicating almost 100% of their time to supplementing our operations. We have also had someone seconded to us to help reconfigure the labor force, adding a third shift to our distribution center, for example, which has really relieved some of the burden. Finally, we have someone else from Partners Group helping to automate the customer journey. It is a very different experience to bringing in a consultant. Our interests are clearly aligned, and we believe this positions us well to continue to capitalize on growing demand in the HVAC sector."

As of 2020, only 30-35% of US warehouses have some level of automation and this is expected to rise to 85% by 2030.

"All these factors combined mean that companies are increasingly willing to spend capital on automation solutions hoping that these investments will ultimately increase efficiency and drive cost reductions across their supply chains," says Henry Elefter, Member of Management, Private Equity Goods & Products.

Indeed, organizations are increasingly looking into the use of control systems, packaging equipment and sensors, and related software to optimize warehouse management.

From a current value of around USD 15 billion, we expect the warehouse automation market will quadruple in size over the next ten years. As of 2020, only 30-35% of US warehouses have some level of automation and this is expected to rise to 85% by 2030.[5] Growth will be driven by new technologies such as automated storage and retrieval systems and be spread across all geographic regions.

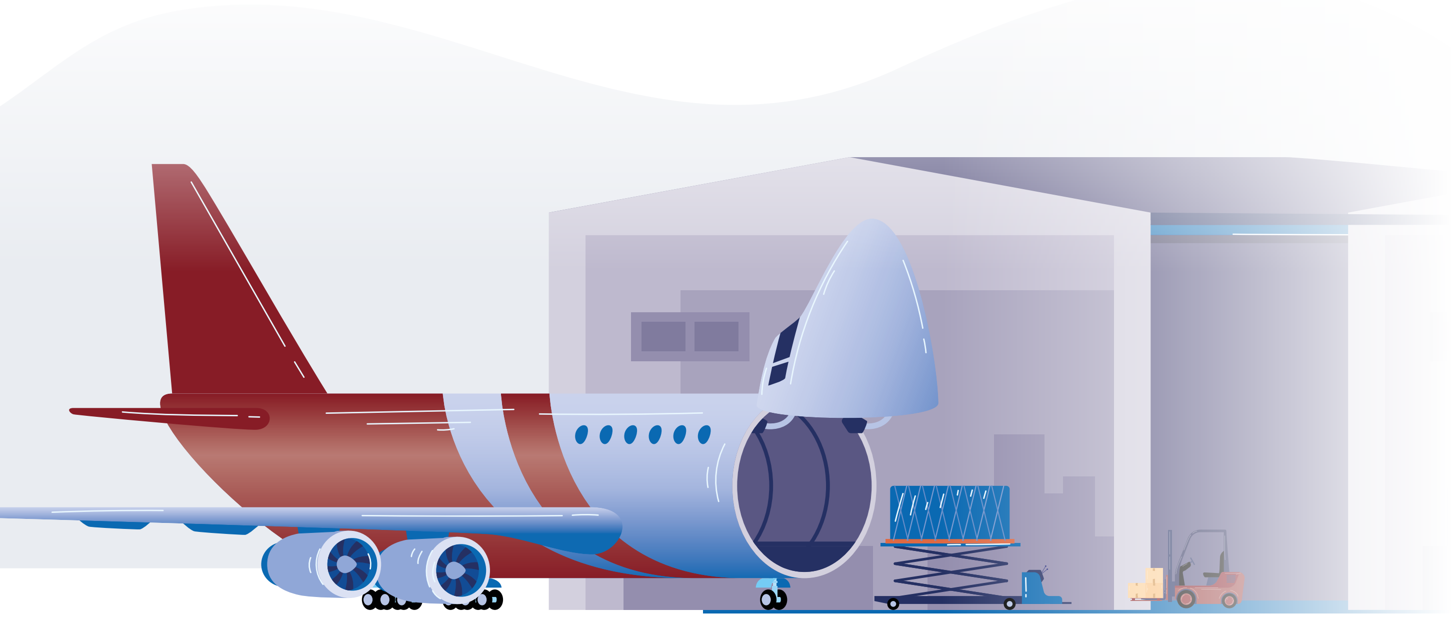
"We believe 'one-size-fits-all' models do not create a winning strategy in automation. Instead, warehouse automation solutions providers will need to focus on customer-centric solutions," says Elefter. Assets with high levels of IP, innovation capabilities, global aftermarket presence and complementary hardware and software solutions will be able to gain a competitive edge. Exposure to attractive end markets such as food & beverage, e-commerce and healthcare, is also key to achieving above-market growth. "Given the adoption of warehouse automation solutions is still in its nascent stage, we believe there is a clear opportunity to build a highly diversified platform in this space," concludes Elefter.

Another area of opportunity emerging from supply chain disruption is the supply chain management software industry. Historically, companies have underinvested in digital supply chain infrastructure and this has exacerbated the impact of major events such as COVID-19 or the war in Ukraine. These recent disruptions have made many companies realize that improvements in visibility, efficiency and agility along their supply chains are long overdue and can help make their supply chains more sustainable in the long term.

Supply chain management software can be divided into three relatively distinctive sub-segments – planning, procurement and execution – with a combined market size of USD 15 billion globally. Each of these sub-segments benefits from strong secular tailwinds and double-digit organic growth rates. However, we believe that the segment that is currently most attractive for private equity investment is supply chain execution software.

"Best-of-breed supply chain execution solutions can capture a higher share of wallet compared to other solutions by complementing underlying and incumbent providers such as enterprise resource planning suites instead of directly competing against them," says Cristina Patrizio Barnard, Senior Investment Research Associate, Private Equity Technology. "The market for these solutions is still highly fragmented, offering ample consolidation potential."

Our focus within the segment is on applications that process and track the day-to-day flow of goods across stakeholders and that can provide key functionalities such as transportation management, logistics provider selection and pricing, carrier management, and tracking.



Outlook

Pervasive supply chain disruption has clearly presented challenges across many businesses, including those in our private equity portfolio. Within the Goods & Products sector, in particular, the ability to receive raw materials – on time and at a predictable cost – is fundamental to any company's success, as is the ability to ship your finished goods efficiently to the end customer.

Our entrepreneurial ownership has afforded our portfolio companies both the resilience and zeal required to navigate this disruption. By providing both financial and operational resources, many of our assets have been able to take market share and to emerge even stronger than before.

Supply chain disruption is also presenting exciting opportunities for those businesses with the agility and drive to take advantage of global upheaval. We believe we are well positioned to identify those businesses and, together with them, create the sustainable and resilient supply chains of tomorrow.

[4] PitchBook, June 2022.

[5] LogisticsIQ research, 2021.

Private infrastructure

Keeping critical supply chains moving

Transportation and logistics infrastructure is critical to the easing of global supply chain bottlenecks

Due to the essential nature of the asset class, private infrastructure assets have been somewhat shielded from the disruption caused by global supply chain upheaval. However, like many other sectors, infrastructure has not been immune to the significant shifts we have seen in the past three years. Across several of the asset class's key sectors, including renewable energy and digital infrastructure, businesses have had to respond to supply shortages and delays.

We have worked closely with our portfolio assets during this period to mitigate the risks caused by supply chain disruption and to ensure we can continue to successfully build out our infrastructure platforms globally. At the same time, we have identified attractive pockets of opportunity within the transportation and logistics infrastructure segment that stand to benefit from the ongoing transformation in supply chains.

Overcoming challenges

Supply chain upheaval is disrupting several key infrastructure sectors. Average downtime days for renewable energy plants soared in the wake of COVID. The solar industry has been particularly affected due to recurring lockdowns in China, combined with a shortage of manufacturing alternatives and logistics bottlenecks at key ports, which have led to a 95% increase in downtime compared to pre-pandemic levels.[6] Costs have also increased dramatically – the cost of battery grade lithium carbonate from China, for instance, has seen a tenfold increase since early 2021.[7]

Meanwhile, the digital infrastructure industry, which was propelled to new heights as the world shifted to remote interaction throughout the pandemic, is also not immune to supply chain disruption. The roll-out of fiber optic cables, essential to providing higher broadband speeds, has experienced delays due to shortages in manufacturing capacity and available labor for installations. The plastic or steel sheathing that covers the fiber is also in high demand and short supply. Costs for these inputs are up too, with fiber optic cables costing around 70% more today compared to early 2021.[8]

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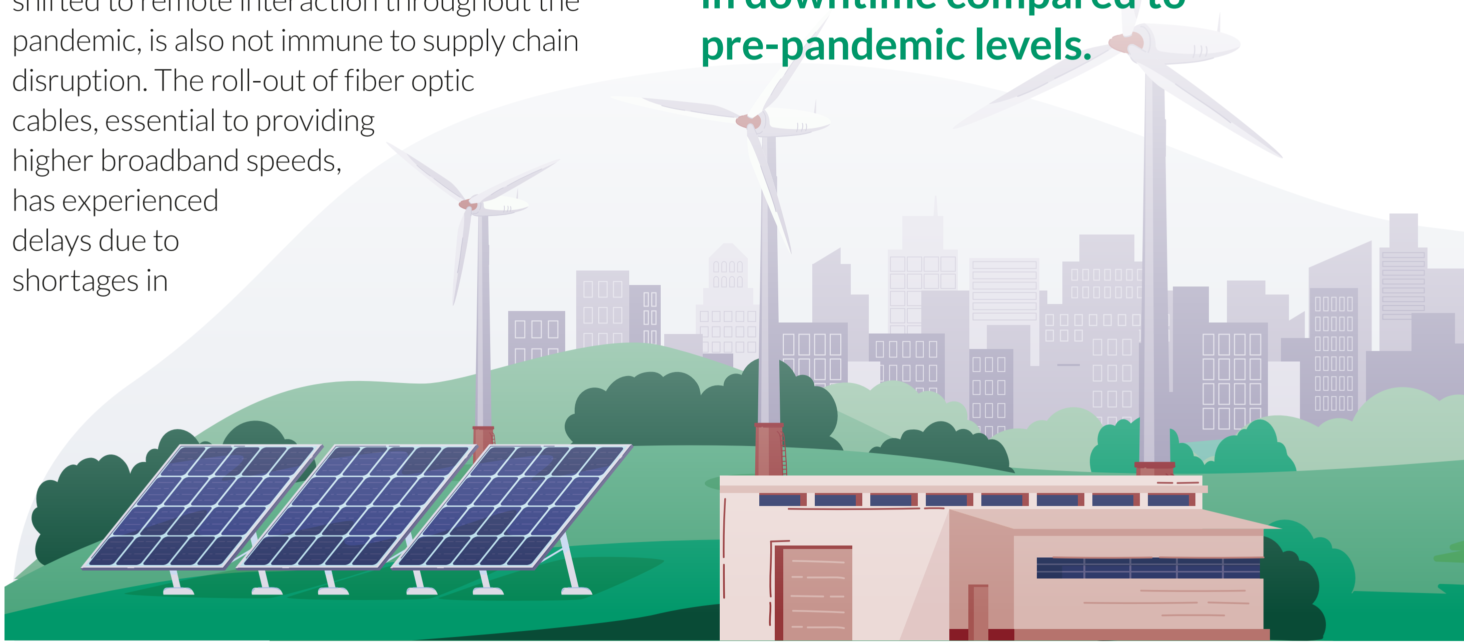

And data centers, of course, are experiencing the same struggles as much of the real estate industry, relying heavily on many of the commodities that have experienced significant supply chain headwinds, including steel, lumber and computer chips. It is now common for the delivery of power generators, servers, and cooling systems to be delayed by several months, and hardware costs have risen by around 10% since the beginning of 2022.[9]

As a response to this environment, we have sought to insulate future growth in our businesses from supply chain disruptions. For instance, for our data center platform atNorth in Iceland, we have pre-ordered equipment in larger volumes and

The board view: Milestone

Partners Group portfolio company Milestone provides transportation equipment solutions to its customers under term lease and rental contracts, and is one of the largest lessors of transportation equipment to the leading US parcel carriers. As such, it enjoys significant tailwinds from the growth in e-commerce. Supported by Partners Group, it now plans to expand its footprint, with the aim of becoming the leading transportation equipment leasing company in the US.

As an integral component of the US logistics sector, Milestone has been at the sharp end of unprecedented supply chain disruption in recent months. “I have been in this business for almost 50 years, and these are the worst supply chain conditions I have ever seen,” says Clarence Gooden, Operating Director on Milestone’s board and Former President of CSX Corporation. “It all began with COVID, of course. But in my view, what COVID really did, was uncover weak links in the supply chain that were already there.”

“When China went into lockdown, container ships were quarantined and couldn’t be unloaded. As Europe followed China in closing its borders, one of the largest supply lines in terms of both distance and volume, almost completely shut down. As a result, ports got backed up. And even when the economy started to open up again slowly in May 2020, trucking companies that were making three turns a day between LA Long Beach and the Inland Empire, were down to two and then one – their income reduced by two thirds.”

As capacity dwindled, prices inevitably soared. Trans-Pacific shipping rates rose from between USD 2,000 and USD 3,000, to as much as USD 20,000. Meanwhile, logistics warehouses became backed up as companies panic ordered items not needed until much later in the year. The situation was further exacerbated by an ongoing shortage of labor. The problems persist to this day. Railroad systems that heavily reduced staff during COVID have proven unable to recruit and train up new employees quickly enough when demand returned. “Railroads are still backed up three years later. And, in my view, it will be another year before they get out from this situation,” says Gooden.

Against this tumultuous backdrop, Milestone’s priority has been to optimize utilization and pricing and to sign customers up for contracts for extended periods of time. “We now have almost 100% utilization and we have ensured that we are getting the full value for our assets”, says Gooden. “That is really paying dividends now and will continue to do so in the future.”

Gooden adds that Milestone’s owners have played a crucial role in implementing this pricing strategy. “Private infrastructure capital is able to bring this wealth of experience and expertise to a company such as Milestone, whilst enabling management to run the business,” Gooden concludes. “It is an ownership model that works extremely well.”

leveraged our strong relationship with suppliers to secure our development timeline across all sites. In the US, in the transportation equipment sector, our management teams have worked closely with original equipment manufacturers (OEMs) and suppliers to manage changing lead times and ensure that we secure adequate access to new equipment.

"We are also being proactive around recession planning, analyzing customer credit trends and inventory trends, for example, as well as analyzing debt levels in preparation for a more challenging environment," says Ed Diffendal, Managing Director, Co-Head Private Infrastructure Americas. "Digitization is another important lever, enhancing visibility in a turbulent supply chain and more effectively matching supply with demand."

Finding opportunity

Unprecedented global bottlenecks have led to a reinvention of supply chains, creating additional demands on transportation and logistics infrastructure and therefore interesting investment opportunities under what we have labelled the critical supply chain theme.

While freight volumes were affected during COVID, we have seen the recovery to be fast and seen volumes accelerate overall. Uncertainty over the pace and sustainability of the post-COVID demand recovery, combined with the more challenging macroeconomic outlook, has increased demand for flexibility by logistics operators.

"The rising cost of financing and inflation have led the producers of goods and products to reconsider their ownership model of logistics that are not core to their business, and as such increase their focus on outsourcing," says Nicholas Pepper, Member of Management, Private Infrastructure Europe. "We are seeing a rise in demand for flexible leasing or rental solutions, under long-term contracts benefiting from inflation pass through capabilities."

We invested in this theme in late 2021 with our investment in **Milestone**, a leading US transportation equipment leasing company, which operates a fleet of c. 100,000 trailers, chassis and containers across more than 70 locations near major logistics hubs throughout the country.

Besides benefiting from the tailwinds in global supply chains, Milestone is also capitalizing on the fundamental changes in the logistics industry that are being created by the ongoing rise of e-commerce and digitization. Indeed, Milestone is clearly positioned to benefit from the continued rise of e-commerce sales, which have grown 3.6x faster than retail sales over the past decade. The business is also benefiting from the shift away from a monolithic and centralized distribution model to a proliferation of smaller facilities, closer to the customer, which has increased demand for its transportation equipment and supply chain solutions.

"It is now common for the delivery of power generators, servers, and cooling systems to be delayed by several months, and hardware costs have risen by around 10% since the beginning of 2022."

These local logistics facilities carry less inventory, which means they have to be replenished more frequently, equating to more movement of goods and therefore increased demand for transportation equipment. A significant increase in reverse logistics – the returning of purchased goods – is further bolstering demand.

"Our plan is to expand Milestone's domestic network, executing on M&A and pursuing adjacent market opportunities. Based on its scale, service, and fleet quality, we have conviction in Milestone's ability to capture a growing share of the transportation equipment market," says Diffendal.

Meanwhile, most of emerging Asia lags both the US and Europe in overall logistics infrastructure. The demand for specialized warehouses and integrated supply chains enabling tracking and tracing far exceeds supply. The gap is particularly acute for cold chain infrastructure across emerging Asia, where rising incomes and a shift to healthier lifestyles increase the need for cold chain warehouses. Even China, one of the top three countries worldwide by overall cold chain capacity, lags significantly behind the US and

Transportation was responsible for 37% of direct CO2 emissions from end-use sectors in 2021, with an even higher impact on air quality in congested urban centers.

Europe on a per-capita basis at c. 20% the US level. However, COVID has provided a push for growth, with governments investing in upgrading logistics, especially within the temperature-controlled supply chain.

Most of the opportunities in Asia will therefore come from newbuild projects rather than from the replacement or upgrading of existing infrastructure. For instance, we are seeing pockets of opportunity in temperature-controlled logistics services providers which are benefiting from greater regulatory attention on food quality and increased demand for freeze or super-freeze warehouses for medical products. This sub-sector remains fragmented with more distributed and smaller facilities – there are around 20,000 cubic meters of these facilities in India compared to 113,000 in the US for instance[10] – versus a more centralized hub-and-spoke approach, offering opportunities for both consolidation and newbuild growth.

Building more sustainable supply chains

Sustainability continues to be paramount when it comes to creating and operating supply chain infrastructure. "The focus on combating climate change remains strong, despite broader macro and geopolitical uncertainties," says Thomas Kontsiotis, Member of Management, Private Infrastructure Europe. Indeed, the global decarbonization mega trend continues to be a major source of investment opportunity, not only in terms of renewable energy generation, but

Alexander Doll

The advisor view: What's next for logistics?

The fragility of international supply chains was laid bare when a global pandemic threw manufacturing and logistics operations into disarray in 2020. But Alexander Doll, Senior Advisor to Partners Group, former CFO at Deutsche Bahn and Chairman of DB Schenker, now acting as an investor, chairman and board member of several corporates and institutions, says that the first visible cracks actually appeared ten years earlier, when an Icelandic volcano spewed ash into the atmosphere, closing European airports for several days.

"It was only a matter of 48 hours or so, but that volcano eruption caused corporates to start rethinking their complex supply chains," Doll says. "Then, of course, there was Brexit, the significance of which should not be underestimated, especially for the automotive industry."

COVID was undoubtedly the biggest shock to hit global logistics, however, shutting down both seaports and airports and significantly increasing the volume of freight being transported by road. "War in Ukraine has now exacerbated the situation even further," Doll adds. "Ukraine is not only one of the biggest exporters of agricultural products, a number of automotive and other industrial OEMs also rely heavily on Ukrainian production."

All of this geopolitical turbulence has intensified talk around the role of nearshoring and Doll says investments are already being made in both Eastern Europe and the US. "In the long run, I certainly believe that manufacturers will shift towards production that is closer to the end customer. The nearshoring thesis will mean an increased focus on rail as well."

Indeed, in addition to mitigating supply chain risk, nearshoring is also aligned with sustainability and ESG considerations. "Nearshoring and the increased use of rail will reduce carbon emissions," says Doll. "You might imagine that in a crisis, other challenges would overtake the need to combat climate change but achieving net zero very much remains a priority."

Investment opportunities

Against this backdrop, Doll believes logistics services targeting essential goods will prove most resilient for investors. He cites food and healthcare as sectors with a favorable risk profile. "You could also argue recycling constitutes logistics," he adds. "That will prove a stable investment opportunity as well." Doll also points to the intermodal logistics value chain as an interesting area for investment. Doll adds that while the first wave of M&A in the logistics sector was focused on getting regional or global offerings in place and the second wave on expanding verticals, today the emphasis is on digitization. "The majority of logistics companies – from the very largest to small family-run outfits – have outdated IT systems in place. Lead times on new systems can be up to ten years and so that digital transformation on top of everything else is taking up a lot of bandwidth and capital expenditure."

Doll believes that artificial intelligence, in particular, has a significant role to play in the sector. "From automating route planning and optimizing warehousing facilities, to better utilizing assets and infrastructure and reducing carbon footprints, AI will become a major component of logistics."

The need to invest significantly in IT infrastructure should lead to a third wave of M&A in the logistics space, opening up opportunities for private capital. "These massive IT investments can be difficult for smaller companies to swallow, particularly when combined with increased regulation which is also increasing costs," says Doll.

"I believe we will see further consolidation. Private capital is already very active in this sector in the US, and I think that will continue. In Europe, given the more fragmented market, private capital has been less prominent, but I expect that to change. There is an opportunity for buy-and-build plays, investments that facilitate succession planning at family-owned businesses and growth capital investment for those logistics players that want to stay independent but >

The advisor view: What's next for logistics? (continued)

don't have the access to capital markets or internal funds that they need."

Meanwhile, a growing number of logistics technology platforms have emerged since the pandemic, as the world recognizes that logistics is the backbone of the economy.

"It remains to be seen whether those businesses will be acquired or whether their business model and cash flow generation will allow them to stand on their own two feet," Doll says. "Regardless, these new ideas are pushing logistics incumbents to be increasingly innovative, and a historically unloved industry is now entering a new and exciting era."

also in terms of greening other sectors, including transportation, especially across Europe.

"We are seeing a similar trend in Asia, with manufacturers facing increasing pressures from their customers to reduce their carbon emissions. This is having a knock-on effect on logistics infrastructure," says Kok Leong Toh, Member of Management, Private Infrastructure Asia.

Transportation was responsible for 37% of direct CO_2 emissions from end-use sectors in 2021, with an even higher impact on air quality in congested urban centers[11]. Large logistics companies are gradually greening their fleets – DHL, for instance, aims to decrease logistics-related emissions to zero by 2050 and has started rolling out electric vans globally – but significant upfront costs are a major deterrent for smaller companies. For aviation and maritime transport, there are limited-to-no economically viable alternatives to fossil fuels today.

The transportation sector continues to grow globally and has only begun its transition toward a more sustainable path, lagging behind the ongoing decarbonization in the power sector globally. The technology and commercialization path remains uncertain, in particular for heavy duty transport, but we are actively looking at opportunities to accelerate the energy transition while achieving attractive risk-adjusted returns for our clients.

Outlook

While it has caused disruption across many sectors, supply chain upheaval has also created significant tailwinds for key infrastructure sectors such as transportation and logistics. We believe these sectors have a critical role to play in easing global supply chain bottlenecks and keeping critical supply chains moving. There is also a clear opportunity to work with leading players in these segments to make supply chains more sustainable in the long term.

Through our thematic investing approach, we remain focused on identifying strong assets and businesses within our critical supply chain theme and building them into next generation infrastructure platforms.

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[6] GCube insurance, "Supply Another Day: Gauging the insurance impacts of renewable energy's supply chain challenge," May 2022.

[7] Bloomberg New Energy Finance, 2022.

[8] CRU Group, 2022.

[9] Turner & Townsend, "Data Centre Cost Index 2022".

[10] Texas A&M University, "2020 GCCA Global Storage Capacity Report", June 2020.

[11] International Energy Agency, 2022.

Private real estate

Logistics assets support the reimagining of supply chains

First- and last-mile logistics real estate is hot property due to global supply chain disruption

Private real estate has not escaped the havoc being wreaked across global supply chains over the past three years, with extended timelines and soaring prices for construction materials. The continued fluctuation of supply chains has affected all property types. During this period, a key focus of our value creation and asset management activities has been ensuring that our assets are well insulated from this disruption.

In parallel, we have also further increased our focus on logistics, an asset class that has experienced significant tailwinds as a result of the pandemic-induced acceleration in e-commerce and supply chain modernization. However, given the more challenging macroeconomic backdrop and the risk of obsolescence for facilities that are not sufficiently up-to-date, selectivity in the sector is key.

Overcoming challenges

While secular demand is robust for the types of best-in-class assets that we target for acquisition, we continue to pursue a hands-on, value creation asset management strategy across property types, which can involve physical improvements as well as technological upgrades post-acquisition. In this pursuit, we can be exposed to the challenges that supply chain disruption poses to all real estate asset classes.

Delays and high prices have impacted a wide variety of building components, ranging from lumber to crucial constituent parts for air handling equipment. "Our response has been to remain proactive and to stay ahead of long lead times," says Anne Jacobs, Senior Asset Management Associate. "We are also comfortable pre-ordering materials in order to mitigate cost escalation risk."

Along with our proactivity and strong partnerships, ingenuity and our thorough knowledge of best practices has made a critical difference in asset management. "We are in the process of an office to life science asset conversion in Boston that includes HVAC components with 30-plus week lead times," Jacobs recalls. "We were able to work with our operating partner to get ahead of the ordering process and to ensure we had the equipment on-site when required, storing the materials on-site in the interim."

"But we were also able to devise temporary solutions to bridge gaps. In the same project, for example, a chip necessary for optimizing air handling performance was unavailable," Jacobs adds. "We were able to find a workaround that meant we could bring the equipment online without that component, on a temporary basis. Agile thinking enabled us to maintain the project timeline and deliver the laboratory space on time."

Within our logistics portfolio, to reduce obsolescence risk, we work continuously to include value-add elements to keep pace with current trends in occupier demand. Some typical value creation steps include the addition of dock doors, LED lighting, and more efficient sprinklers that allow pallets to be stacked higher.

Finding opportunity

Logistics assets have clearly benefited from supply chain disruption. In particular, there has been a marked shift away from the historical just-in-time model, where companies minimized inventory to save money and space, to a just-in-case model. Indeed, inventory levels continue to trend upwards as companies prioritize product availability to avoid the shipping delays that eroded potential profits at the height of the pandemic.

Inventory upshift is not just a COVID phenomenon. The share of revenue driven by customer experience is so significant today that companies don't mind carrying additional levels of inventory on their balance sheet if it means retaining customer loyalty.

Despite robust sectoral demand drivers, the broader macroeconomic environment does hold some concern even for the logistics sector. "The velocity of retail sales is currently holding up, as is the personal saving rate, but sticky inflation and increasing recession risk could dampen goods consumption going forward," explains Audrey Symes, Lead Investment Research, Private Real Estate Americas.

Online retail giant Amazon, for instance, has found itself with a surfeit of warehouse space, having

doubled capacity during the pandemic, and is now pausing expansion. This pause is also due in part to the effect of increased automation, which will help occupiers such as Amazon that are investing heavily in this area, to optimize the use of space.

Revenue growth in the logistics sector is expected to stabilize over the next few years as supply planned several years ago starts to come online while consumption faces headwinds. And so, while logistics remains a high conviction theme for us within the real estate asset class, selectivity at the asset and market level has become paramount.

Against this backdrop, there are a number of sectors within logistics that we currently favor. "We are seeing opportunities in the last-mile logistics space, for example, as third-party logistics operators and e-commerce retailers increasingly recognize the importance of optimizing transportation time and costs to their end customers by being as close as possible to them," says Romain Ruiz, Member of Management, Private Real Estate Europe.

Recent last-mile logistics investments for Partners Group include LogCap, a portfolio of 19 assets located in the Drammen-Langhus-Lillestrøm logistics triangle, in Oslo, where it is possible to reach around two million people – or 37% of Norway's population – within a one-hour drive. Another example includes a portfolio of 19 assets, this time primarily around the Helsinki area in Finland, where a limited supply due to residential conversions and a strict urban land use policy, combined with rising e-commerce sales is underpinning rental growth.

"At the other end of the spectrum, meanwhile, we are also seeing opportunities in the first-mile logistics space – the centralized distribution centers that are the first step within order fulfilment," Ruiz adds. "This is likely to become increasingly important as companies look to hold more inventory in domestic markets to avoid supply chain disruption. It is a theme that has been evident across many sectors through the pandemic, but particularly notably with semiconductor chips."

Within both first- and last-mile logistics, location is paramount. Access to labor, for example, is becoming increasingly important in a challenging recruitment environment. Supply chain positioning is another key consideration. In this aggressive industry, a logistics asset that provides tenants with a competitive advantage is well-positioned to benefit its owner with respect to NOI potential. "Rent, after all, is only a small component of an occupier's total distribution costs," says Eric Shepsman, Member of Management, Private Real Estate Americas. "Transportation represents the lion's share. A logistics space that reduces mileage is therefore more important than reduced rent, which will factor into what tenants are willing to pay."

It is also important to ensure you are investing in a product with advanced specs, with optimal numbers of docking stations, ceiling heights and floor capacity, for example, to ensure occupiers can operate efficiently.

Additionally, ESG compliance, which heretofore has been largely limited to office assets, is gaining in importance to occupiers as they seek to meet their sustainability objectives. This shift in occupier priorities is leading to an increased focus on insulation, for instance, as well as EV charging stations and solar panels; it also raises the level of obsolescence risk for older assets.

"Some older product is proving resilient due to its infill location and subsequent value for last-mile logistics, creating opportunities for retrofit and improved management. For bulk distribution, however, we are very much focused on Class A product located on key distribution routes or new ports," Shepsman says.

Life sciences

An interesting adjunct to the logistics sector involves life sciences real estate. Life sciences was one of the first sectors to reveal supply chain fragility through the pandemic, with important pharmaceutical components routinely being sourced from overseas. There has since been a push to localize the life sciences supply chain, although we are not anticipating a complete reversal of globalization, and we recognize that nearshoring manufacturing will not happen overnight.

Indeed, despite a slight slowdown in some areas of life sciences demand as capital markets are shaken by macroeconomic events, we retain a positive outlook on the life sciences sector, not least because this is one area of the economy where working from home is not an option. Occupiers rely on expensive and un-substitutable on-site equipment and in-person research collaboration to maximize their productivity, which bodes well for life science asset value retention in areas with a critical mass of educated professionals and research dollars, such as Boston, the San Francisco Bay Area, and Southern California in the US.

Meanwhile, there is also opportunity generated by a real shortage of purpose-built life sciences real estate in Europe, which is leading some occupiers to move to multi-tenant light industrial parks. These parks provide the necessary floor space, ceiling height and ventilation for successful conversion and repurposing.

Outlook

While logistics may be a clear winner when it comes to private real estate in the midst of global supply chain disruption, there is huge variability within the sector. It is critical both to select well-positioned and high-grade assets at acquisition, and to continuously track and assess value-add opportunities to maximize the longevity and investment returns of the portfolio.

We remain focused on finding those assets that we believe are best positioned to satisfy the demands of logistics occupiers and keep key segments of our economies running.

Private debt

Financing the future

Private debt plays a critical role in funding long-term supply chain solutions

Private debt is an asset class that typically copes well in periods of volatility and has been no different when it comes to supply chain disruption. While banks have retreated through the pandemic and during Russia's invasion of Ukraine, and the high yield and syndicated new issue markets proved fickle, private lenders such as Partners Group have remained active, offering borrowers certainty of execution in uncertain times.

In fact, supply chain disruptions, combined with today's tumultuous macroeconomic and geopolitical environment, do not deter us. We see significant opportunity to finance businesses offering sustainable supply chain solutions that offer defensible market positions, strong business models and attractive financial profiles. At the same time, we remain focused on ensuring our portfolio companies are sufficiently protected against disruption and have further increased our emphasis on supply chain resilience during due diligence.

Overcoming challenges

Supply chain turmoil has meant that some businesses have experienced severe working capital implications as they are forced to move away from just-in-time models, instead tying up cash in increased inventory levels and the associated warehousing capacity to store it. In parallel, supply constraints and geopolitical events have caused the prices of raw materials to soar. And while the cost of freight is slowly easing, it remains well above pre-COVID levels, due to a confluence of factors ranging from a decrease in commercial air traffic to a shortage of truck drivers.

"These escalating input costs can have a profound impact on profitability if the business does not have the pricing power, or contractual authority, to pass these costs onto the customer," says Carina Spitzkopf, Member of Management, Private Debt Europe.

Companies adversely affected by the current environment must respond swiftly and proactively and companies in our private debt portfolio are taking a whole host of measures to combat these challenges. "Some are decreasing the number of stock-keeping units in their inventory to reduce complexity, for example, focusing on core, rather than ancillary products," says Spitzkopf. "Others are prioritizing key customers, to ensure core relationships are maintained."

The ability to weather and even thrive in the current maelstrom of macroeconomic events has inevitably filtered through into our underwriting processes. Of course, supply chain resilience and cyclicality have always formed part of due diligence, but now these factors are gaining even more emphasis.

"We look for evidence of a sound reason for a business to exist and strong position in the value chain, resulting in bargaining power," says Henri Lusa, Managing Director, Private Debt Europe. "We are also highly focused on investing alongside quality sponsors, with a strong track record, operational abilities and sufficient dry powder to support portfolio companies. A thorough assessment of an asset's sensitivity to inflation and the potential for supply chain disruption forms a key part of our due diligence on every new investment opportunity," says Oliver Baker, Member of Management, Private Debt Europe. "We are particularly focused on the ability of businesses to weather periods of input shortages; pressure on margins and ability to pass through price increases and working capital robustness."

An asset's energy transition journey is also coming under increasing scrutiny, not only due to ESG considerations, but also geopolitical dynamics and concerns around energy security.

Finding opportunity

While many banks have retreated during supply chain upheaval and geopolitical uncertainty, private debt lenders have been able to club together to invest in larger assets that would have historically gone down the syndicated or high yield route. The shift in competitive landscape has enabled them to negotiate better economics and stronger legal protections.

In addition, private debt lenders are finding attractive opportunities investing in hung

Supply chain successes

A sample of businesses recently backed by Partners Group that are benefiting from supply chain disruption

Ligentia is an international supply chain management company with revenues of over GBP 1 billion. The UK-based company provides a range of services, mostly delivered via ocean and air freight, as well as third- and fourth-party logistics services to customers in the retail, consumer, industrial, healthcare and manufacturing sectors, which require support with the handling of goods imported from the Far East. Ligentia has a presence in 25 locations worldwide, as well as local partnerships. It also provides a proprietary technology platform, Ligentix, which offers real-time visibility and data analytics at an individual SKU level, whilst delivering increased automation for its customer supply chains.

ecovium, meanwhile, is a German company that provides end-to-end logistics software and hardware, facilitating and automating logistics processes for companies shipping and storing goods. The business has recently acquired Athens-based Mantis Group, which provides warehouse management software across more than 30 countries, in order to support its internationalization strategy and to capitalize on trends driving the digitization of supply chains as companies search for increasing efficiency, visibility and traceability. We refinanced ecovium's existing credit, as well as financing the acquisition and providing additional lines to finance further potential add-ons. The transaction involved an ESG-linked unitranche facility.

Semiconductor supply chain

Nearshored suppliers to the chip manufacturing sector are experiencing strong demand on the back of geopolitical tensions

Kusters Beheer offers advanced manufacturing capabilities for the production of high-precision machined components. It has an international customer base, primarily in the semiconductor industry, as well as the aerospace, automotive, food and medical sectors. We provided financing to support Equistone's acquisition of the company. **CoreDux**, meanwhile, is a manufacturer of flexible gas and fluid artery systems, also serving the semiconductor industry and based in the Netherlands. The business was recently acquired by Arcline, with our private debt backing.

positions, which often come with compelling economics. The syndicated secondary market has also been trading at a significant discount, providing an opportunity to buy quality assets in key growth industries at attractive prices.

There are some industries that are particularly well placed to benefit from the current market backdrop. Across our direct lending activities, we are focusing our attentions on the logistics sector, for example, as companies increasingly rely on third-party expertise in the face of pervasive supply chain disruption.

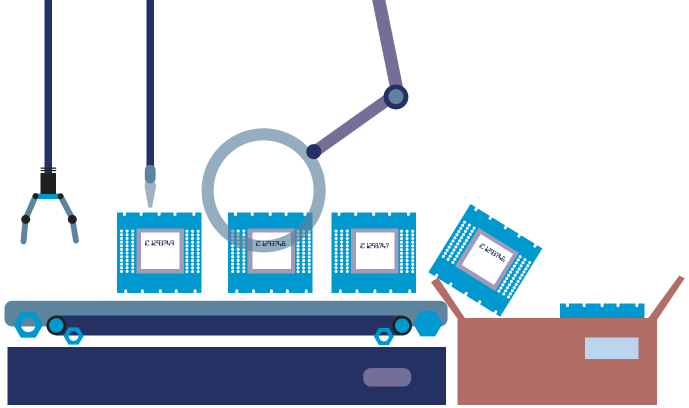
"Logistics partners can help to manage complex supply chains, reduce unnecessary costs, improve customer service levels and ultimately help companies remain competitive in a difficult macro environment," says Lusa. "We also see an opportunity to lend to logistics technology providers – for example those businesses helping to automate warehouse operations." Recent investments we have completed in the space include supply chain service provider **Ligentia**, and logistics technology company **ecovium**.

We also see real opportunity in the IT services and digital transformation arena. "COVID accelerated the shift towards digital transactions and operating models," says Baker. "Meanwhile, digitization will also be one of the key drivers of automation, which will only increase as wage inflation continues to soar."

Outsourced IT services businesses are benefiting from these trends, as well as reducing customers' direct exposure to the IT labor market, where there is a scarcity of supply. Recent investments in this space include Odin Groep, a specialist provider of IT solutions based in the Netherlands.

A third sector which we deem to be attractive involves the semi-conductor supply chain. "Chip shortages as well as geopolitical concerns have driven significant investment into chip manufacturing capabilities and many Western governments are reshoring chip manufacturing capacity, which has historically been centered in Asia, in order to reduce the risk of supply chain disruption," explains Baker.

This reshoring began during the pandemic but has escalated as a result of current tensions between China and Taiwan, with the latter accounting for more than 60% of global semiconductor



production[12]. The US is also putting pressure on suppliers of chip manufacturing equipment not to supply China and both Europe and the US have signed 'Chip Acts' to encourage domestic investment into manufacturing capability.

Chip manufacturers are therefore massively investing in production capacity and diversifying geographically at the same time. Suppliers of machines and components are seeing a resultant surge in demand. ASML, which has a monopoly on the latest tech lithography equipment, for example, has a record backlog of approximately EUR 30 billion in orders. On the back of this trend, Partners Group has invested in suppliers of components to ASML, including **Kusters Beheer**, which provides machined metal parts, and **CoreDux**, which provides high purity hoses.

And finally, we still see select opportunities to lend to businesses that are exposed to international supply chain challenges. Pet food, for example, is a resilient sector that has further benefited from increased pet ownership during COVID.

Many of the inputs into pet food, such as wheat, grain, meats and electricity costs have experienced significant increases – the price of wheat doubled for a three-month period following Russia's invasion of Ukraine. Furthermore, passing costs onto a concentrated customer base, dominated by major multiples such as Tesco, can be taxing and there is often a lag. The situation has been exacerbated by shortages in packaging, which has caused manufacturing disruption, as well as labor shortages amongst manufacturing staff and HGV drivers.

Exemplars in the sector are responding to these challenges by hedging raw materials to tie with price negotiations; increasing inventory levels to protect against supply chain disruption and manufacturing and sourcing products locally where possible. We are also seeing a market consolidation opportunity in sectors such as this for more sophisticated players, which are better positioned to manage cost inflation through effective hedging and by passing on price increases.

Outlook

The cost of supply chain disruption, combined with geopolitical and macroeconomic uncertainty, has been felt across many businesses globally. Selectivity is paramount in the current environment, and we strongly favor new credits that are less exposed to supply chain volatility and inflation, as well as to spiraling energy costs. However, we also see pockets of real opportunity for companies easing global supply chain and labor market disruption and we believe that the private debt industry has a critical role to play in financing these solutions.

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[12] Boston Consulting Group, April 2021.

Outlook

Creating the supply chains of tomorrow

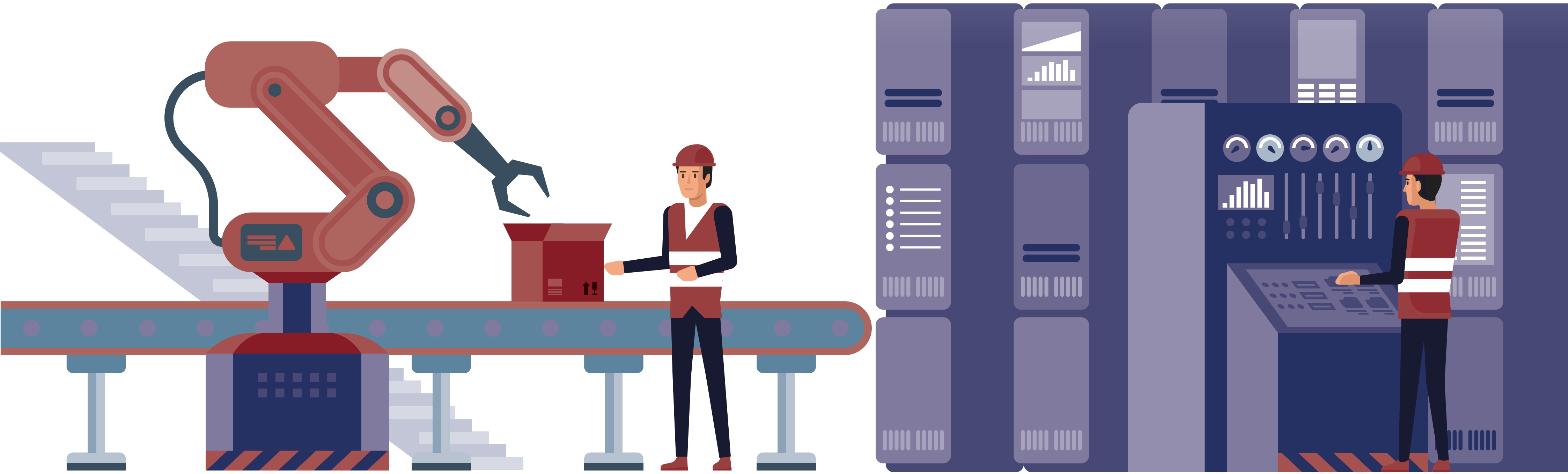
There is no doubt that short-term supply chain disruption has impacted most sectors of our global economy. It is also clear that there will be long-term repercussions as the world reassess supply chain risk.

But where there is disruption, there is opportunity. Across private markets asset classes, we are seeing attractive new investment opportunities in light of some of the structural changes that are taking place. Differentiated and innovative manufacturing and logistics companies and assets that are able to respond to these shifting dynamics with agility and entrepreneurialism will add value for their customers, ultimately creating value for themselves.

We continue to see significant opportunity in these themes, therefore, and believe that private capital has a powerful role to play in creating the resilient and sustainable supply chains of the future.

Meanwhile, although supply chain pressures may finally be starting to ease, it is clear that there are numerous other challenges on the horizon, including spiraling inflation and interest rates, together with geopolitical tensions and an inescapable sense of uncertainty.

With its entrepreneurial ownership model, we believe private markets ownership remains the best possible model for navigating more challenging times and ensuring that our assets come out the other side stronger than before.



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