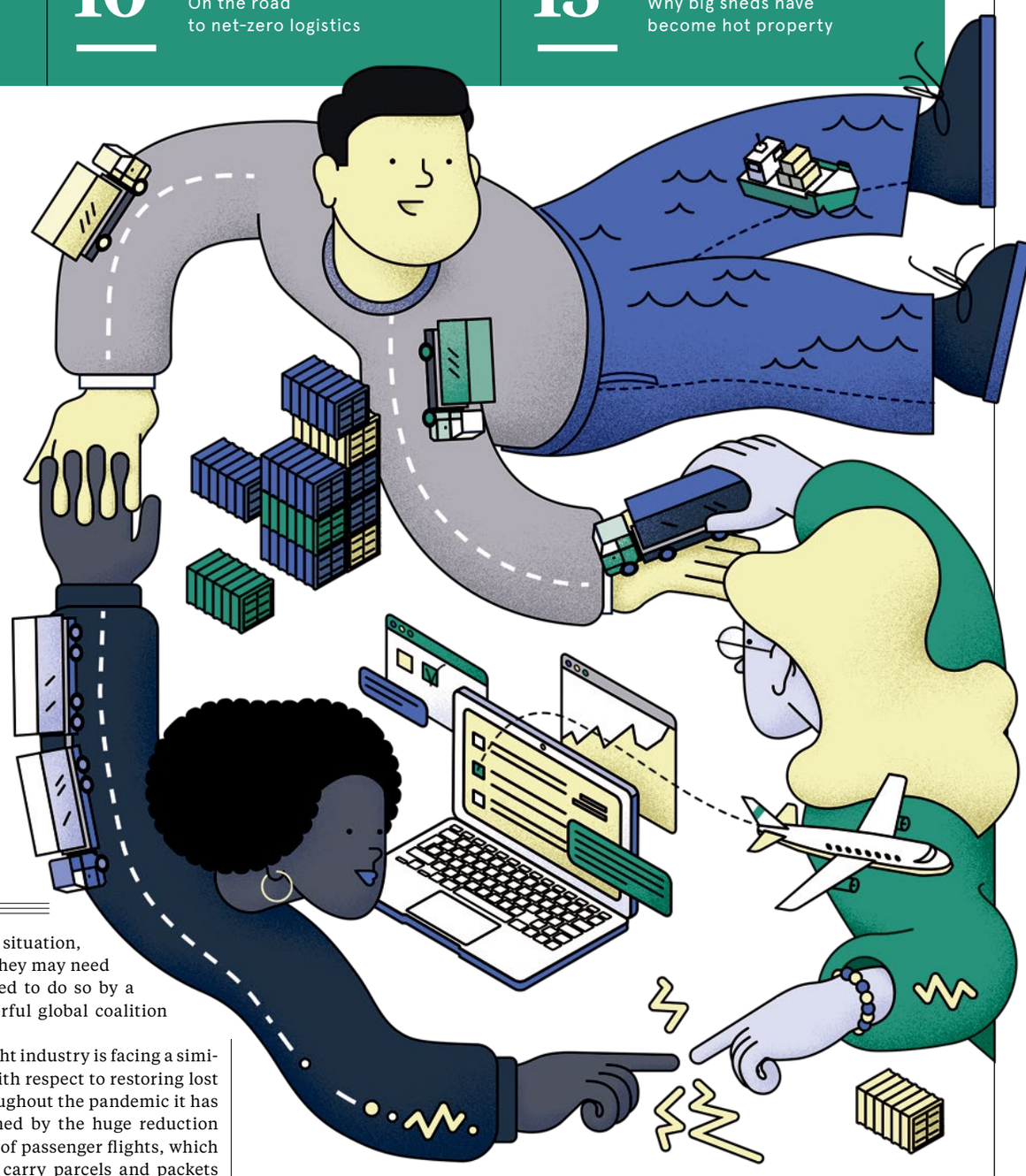
SUPPLY CHAIN RESILIENCE

STRATEGY

Black-swan attack: can world trade take much more trauma?

It's been a tough time for the freight and logistics sector, which is reeling from a flurry of blows. This has inevitably raised questions about its resilience to further shocks



Jonathan Weinberg

Global supply chains have been tested to their limit over the past 18 months, beset by problems ranging from the Suez Canal blockage and a huge logjam in China's ports to the UK's so-called pingdemic and the implementation of new customs rules in the EU.

As standalone events, each has had the potential to disrupt an interdependent system where even the shortest of delays can leave businesses facing millions of pounds in extra costs and lost revenues. Their arrival in such quick succession has amplified the disruption, which has hampered the efforts of linked economies to recover from the Covid crisis. And there is no end yet in sight.

Richard Parkinson, port director of the Solent Gateway, one of the UK's fastest-growing ports, does not believe that this seismic episode has highlighted inherent weaknesses in the system. He argues that global supply chains have become "remarkably robust, efficient and agile", thanks mainly to advances in digital technology.

"What we saw at the end of 2020 was that perfect storm of Covid-19, meaning a reduction in the number of shipments; Brexit stockpiling; and the pre-Christmas surge," Parkinson says. "Everything happened at once and the supply chain couldn't get enough stuff in or get containers back out to the Far East and India. The whole system clogged up."

He continues: "I don't think that there's an endemic problem in the global supply chain, but of course there are black-swan events. They have happened and they will happen again. The most important thing is that the logistics providers gather the right data and analyse it to determine how key risks can be mitigated in the future."

> **The most important thing is that the logistics providers gather the right data and analyse it to determine how key risks can be mitigated in the future**

One big headache that Parkinson does foresee is that, as demand increases again, there may not be sufficient capacity in the system to respond quickly enough. He notes that container prices have rocketed because there are far fewer ships at sea. With many operators having cut jobs during the Covid crisis, he fears there will be little incentive for them to risk returning to pre-pandemic resourcing levels, especially as some may be making similar, or even greater, revenues with less inventory.

Parkinson hopes that the world's three dominant shipping alliances will act to rebalance the situation, but adds that they may need to be challenged to do so by a similarly powerful global coalition of interests.

The air-freight industry is facing a similar situation with respect to restoring lost capacity. Throughout the pandemic it has been constrained by the huge reduction in the number of passenger flights, which would usually carry parcels and packets in their holds.

Simon Batt, chief executive of Asendia UK, which carries goods from several fashion etailers to consumers worldwide, says his company had to charter passenger aircraft to manage the disruption, putting packages on the seats that should have been occupied by holidaymakers and business travellers.

He adds that the shortage of lorry drivers in the UK has been a more recent problem for the business. This has made handling the workload created by the spike in online consumerism during the Covid lockdowns even more of a challenge.

Agreeing with Parkinson that their industry has been enduring the perfect storm, Batt says: "While I don't think that supply chains are cracking, an enormous amount of pressure has fallen on people, networks and resources over the past couple of years."

Batt also questions whether it was right to introduce so many regulatory changes in the UK and the EU in such a short time.

"Governments and other authorities clearly do a great deal of work to negotiate treaties and write legal documents. What they don't do enough is actually talk to the people who'll have to live with their decisions thereafter," he says. "Writing a treaty is one thing, but in the supply chain it is the logisticians who must pick it up and run with it. It's therefore important that the authorities get more industry bodies and representative companies involved in how things are done."

Jens Roehrich, professor of supply chain innovation at the University Bath School of Management, sees these recent events as simply the latest in a long list of disruptions for those with the task of managing international supply chains, "no matter how sophisticated their systems and risk management processes are".

He cites the Eyjafjallajökull volcano eruption in Iceland in 2010 and the pirate attacks off the Somalian coast that were regular occurrences between 2005 and 2013 as examples.

"Although disruptions to supply chains are never easy to deal with, these trying times require, more than ever, a combined approach among buyers, suppliers and governments, so that we can cope with disruptions. The situation could maybe even stimulate more innovative ways of working," Roehrich says.

Joanna Konings, senior economist for international trade at Dutch banking group ING, believes that, while the litany of recent disruptions is extraordinarily long and varied, it highlights some of the ways in which global trade is changing. For instance, "trade barriers between countries have been going up, often in much less visible ways than tariff increases".

She thinks that the sector should have learnt from its experiences during the pandemic that "a reshoring response [the reversal of offshoring] won't save us. Countries and companies may well decide that they need to use a more diverse range of suppliers and markets, and to stockpile certain goods. But building inventories in response to the uncertainty is simply piling more pressure on the system."

Konings concludes with a stark assessment. "The way that costs are mounting on different fronts, from trade barriers to the rising price of shipping", she says, "is a threat to business as usual."

A LITANY OF DISRUPTION

Several events have tested the resilience of supply chains over the past 18 months

February 2020
The Covid-19 outbreak in China causes major container lines to cut capacity from Asia to Europe

March 2020
The Covid-19 epidemic becomes a pandemic. The price of oil collapses owing to a decline in demand

April 2020
A huge increase in demand for medical equipment such as ventilators and PPE distorts global supply chains

October 2020
Logistics firm CMA CGM is struck by a ransomware attack, illustrating the dangers of shifting to more digital operations

November 2020
Joe Biden wins the US presidential election, raising questions about the country's future trade policy

December 2020
Trade is hit by huge queues at English ports owing to Brexit stockpiling and concerns about the new Covid variant

January 2021
The UK leaves the EU

March 2021
The container ship Ever Given runs aground in the Suez Canal, blocking the vital freight channel for nearly a week

July 2021
The so-called pingdemic in the UK causes supply chain problems, as thousands of employees are forced to isolate themselves

2020 2021

Distributed in
THE SUNDAY TIMES

Published in association with
CIPS Chartered Institute of Procurement & Supply

Contributors

Maria Highland
A freelance journalist specialising in technology and all things relating to supply chains and logistics.

Virginia Matthews
An award-winning journalist specialising in business, education and people management.

Jim McClelland
A futurist, speaker and writer specialising in the built environment, corporate social responsibility and ecosystem services.

Rich McEachran
A journalist covering technology, innovation and startups, writing for *The Guardian*, *The Telegraph* and *Professional Engineering*.

Oliver Pickup
An award-winning journalist, specialising in technology, business and sport, who contributes to a wide range of publications.

Chris Stokel-Walker
A journalist and author specialising in tech and culture, with bylines in *Wired*, the *New York Times* and *The Guardian*.

Ouida Taaffe
The editor of the London Institute of Finance & Banking's journal, *Financial World*. She has also worked for *International Financing Review* magazine.

Jonathan Weinberg
A journalist, writer and media consultant specialising in technology, business, social impact and the future of work and society.

raconteur reports

Lead publisher
Emma Ludditt

Managing editor
Sarah Vizard

Deputy editor
Francesca Cassidy

Sub-editors
Neil Cole
Christina Ryder

Head of production
Justyna O'Connell

Design and production assistant
Louis Nassé

Design
Pip Burrows
Kellie Jerrard
Colm McDermott
Jack Woolrich
Sean Wyatt-Livesley

Illustration
Samuele Motta
Nita Saroglou

Art director
Joanna Bird

Design director
Tim Whitlock

Commercial feature

Local logistics keeps society ticking

Locating last-mile logistics facilities in urban areas is the key to powering sustainable local economies, filling crucial talent shortages and enabling the sector to continue its essential work

The logistics sector supports the smooth functioning of society, not to mention 2.6 million jobs across the UK economy, but it took a global pandemic for the vital daily role it plays to be truly recognised. In the three months up to May 2020, internet sales as a percentage of total retail sales jumped from 18% to 32.8%, a growth rate that would have taken a decade to realise had it not been for the unprecedented national lockdown. Armed with key worker status, the logistics and transport sector kept supply chains ticking and kitchens stocked at a critical time.

Having propped up the economy at a time of crisis, the logistics sector is now one of the few sectors actively recruiting as it continues to grow and adapt to higher online retail activity. However, it faces its own challenges. Firstly, there are widespread talent shortages, with the widely reported 60,000-strong HGV driver shortage being the tip of the iceberg. There are also increasing warehouse operative roles that need filling and, with the ongoing rise of automation, engineering and technical roles too. While the prevailing view might still be that the sector is heavy on low-skilled jobs, that is no longer the case in this rapidly changing industry.

Recent research from Prologis, the global leader in logistics real estate, shows that demand for skills in areas such as data management and analysis, as well as developing training algorithms for use in optimising shift patterns or inventory management, has increased significantly. Though this is creating opportunities for personnel with digital and managerial skills, and logistics is one of the few sectors where there are few barriers to both entry and progression, a skills gap is holding organisations back from maximising the value of new technologies.

"For the last three or four years, the biggest issue that our customers have been facing is attracting and retaining the right talent needed to deliver logistics services," says Robin Woodbridge, senior vice president and head of capital deployment for Prologis in the UK. "In a low-margin sector, logistics and transport firms often struggle to showcase the opportunities available. They just haven't got the money to promote themselves and the sector."

The second challenge facing the sector is space. Every year £54bn worth of goods flow through Prologis distribution centres in the UK alone, equivalent to 2.6% of the UK GDP. CBRE data suggests that for every extra £1bn spent by British consumers online, an additional 900,000 square feet of logistics space is needed. And, according to Prologis, for every square foot of space required for a bricks-and-mortar retail store, three square feet of logistics space is needed to fulfil the same demand online.

However, last-mile logistics facilities can't be located anywhere. Online consumers want products to be delivered fast with a growing demand for same day deliveries. With the speed at which goods can be supplied to consumers beholden to how far away they are, last-mile logistics facilities must be located within urban areas of dense populations.

This is where the logistics sector currently appears to be on the wrong side of planning policy. While the government recognises the need for more logistics facilities, it's clear that the current proposals to reform the planning system are too focused on supplying new homes with no regard for logistics. This is a concern, especially when you consider a city as economically important as London has already lost around 100 hectares of industrial land annually over the past decade.

"While locating large warehouses on motorway junctions works well for storing bulk goods, it's naïve to think you can just stick all last-mile facilities there as well," says Woodbridge. "We've not yet come up with a teleporter to move things faster. As the need for goods to be delivered quickly continues to grow, you've got to hold a body of those goods closer to people. Of course, there is a housing crisis that needs to be solved, but we need a sense of balance and greater awareness, among consumers and government, of how important these facilities are.

"There is a damaging misconception that locating these facilities outside of cities is good for sustainability, reducing traffic and improving air quality. That couldn't be further from the truth. Through research produced in partnership with MIT, we've demonstrated that, to be sustainable, last-mile logistics facilities should be located close to where people live to enable the last-mile route to be faster, as well as be handled by electric vehicles. According to the research, online shopping is 36% more sustainable than bricks-and mortar shops. Transport-related emissions can be reduced by a further 50% if the right number of these buildings are in urban areas, and another 27% via the shift to electric vehicles."

> **Having propped up the economy at a time of crisis, the logistics sector is now one of the few sectors actively recruiting as it continues to grow and adapt to higher online retail activity**

Crucially, the challenges of recruiting talent and space are interlinked. Locating logistics facilities closer to where people live not only allows for faster deliveries but creates lots of job opportunities close to home, from entry level to senior management. An Oxford Economics study in 2020 of the 22 industrial logistics parks owned and run by Prologis in the UK found they were responsible for the employment of around 100,000 people.

Prologis has invested over half a billion pounds in London and the Home Counties in the past 18 months to ensure it can provide the urban logistics facilities its customers need. It also recently introduced the Prologis Warehouse and Logistics Training Programme, a digital learning and development programme aimed at training those leaving education, the unemployed and those looking to reskill, equipping them with the knowledge needed to pursue a career in the logistics sector. The initiative aims to retrain 25,000 individuals globally by 2025.

"Some of the most difficult roles for the sector to fill are software engineers and project managers, and we've already got our customers queuing up to provide opportunities for the people we're training," says Woodbridge. "The sector does a great job of getting on with what it's asked to do, but for too many years we've taken it for granted. It serves a vital societal function and is essential to everyday life, so we need to start planning for it now, whether that's for creating local jobs or the sustainable location of last-mile facilities."

£54bn

worth of goods flow through Prologis' UK distribution centres every year, equivalent to 2.6% of UK GDP

900,000 sq. ft.

of extra logistics space is needed for every extra £1bn spent by British consumers online

Online shopping is

36%

more sustainable than bricks-and mortar shops. Transport-related emissions can be reduced by a further 50% if the right number of these buildings are in urban areas, and another 27% via the shift to electric vehicles

For more information, visit prologis.co.uk

PROLOGIS®

INTERVIEW

'It's up to all of us to be ambassadors'

As the building safety bill makes its way through Parliament, construction procurement needs to shake off its below-stairs image, argues Laing O'Rourke's procurement chief, **Carol Williams**

Virginia Matthews

A mix of innate curiosity and a keenness to leave full-time education prompted Carol Williams to land a job that she'd never even heard of with the Ministry of Defence at the age of 18. Despite her "huge learning curve", she relished the role in MoD contracts and finance, which entailed buying warships, and spent the next three decades rising through the ranks of armaments and aerospace procurement.

Today, as Laing O'Rourke's head of procurement, Williams controls an annual budget of £1.8bn in the equally male-dominated construction industry. She has never forgotten the early days of her career – "girlie calendars on every wall and lots of making coffee" – and continues to advocate for women in the workplace.

> **Anyone in this profession can keep prices down. But, in terms of its social value to communities and its commitment to sustainability, procurement has to start meaning much more**

Moreover, in light of Grenfell, Brexit and Covid, she believes that the value of procurement itself needs to be championed.

"Anyone in this profession can keep prices down. But, in terms of its social value to communities and its commitment to sustainability, procurement has to start meaning much more," Williams says. "It's up to all of us to be ambassadors for a job that brings immense value to organisations every day, yet is still misunderstood and underestimated by our colleagues and the public."

Declaring frustration at the preference of many millennials for careers in the hi-tech sector – "it's Amazon, Google or nothing" – Williams notes that attracting digital skills to procurement, particularly in construction, is still a work in progress.

"We need data analysts, business analysts and digital engineers. But, as I can testify, young people often have a strange idea of what procurement is," she says.

Williams was hired by Laing O'Rourke in 2019 to represent her department to the company's stakeholders on issues such as safety, quality and digital transformation. She leads a team of more than 100 and oversees a supply chain of about 2,500 firms.

While others may envy her extensive brief and budget, Williams believes that all procurement leaders can and should seek to show their value. It's about being brave, becoming an influencer and, above all, demonstrating competence, she says.

Williams counts herself lucky to report directly to Ray O'Rourke, the company's veteran founder, chief executive and chairman, who is "personally committed to raising procurement standards". This has given her a solid platform from which to influence both the organisation and the wider industry.

Williams' expertise in occupational safety – gained in several senior roles over two decades at Lockheed Martin – underpins her considerable clout. Effective safety procedures are entrenched in the aviation industry, but this is not true of construction, where many workers are accustomed to using potentially dangerous equipment in suboptimal conditions.

"I was a complete outsider to the world of construction," she says. "I don't doubt that this was why I was approached, completely out of the blue, to help make safety part of this company's DNA, both for our workers and for the public who use our buildings every day."

Although improving the safety record of construction is a vital first step in improving the industry's tarnished image, it also feeds into two other pressing issues: digital transformation and recruitment. In addressing the safety concerns of its clients, Laing O'Rourke – whose projects in progress include Hinkley Point C nuclear power station and the Elizabeth Line and HS2 railways – wants more than 90% of its projects to be factory-built by 2025. Achieving this stretching target will require employees to undergo a considerable amount of technological training.

While hiring enough digital engineers and analysts to handle this transformation may not be her team's responsibility, Williams is ready to get involved.

"I tend not to swim in my own lane," she says. "I've always found that strict reporting lines are irrelevant when organisation-wide issues such as talent acquisition require cooperation among departments."

A natural collaborator, Williams says that her colleagues at Laing O'Rourke have always welcomed her perspective as an outsider. Ever since she joined the company, her team has "become known as the go-to function" for help in tackling a range of problems that wouldn't normally be seen as a procurement concern.

Her approach was recognised last year by the Chartered Institute of Procurement & Supply, which granted Laing O'Rourke an award for excellence. It commended her department for being "core to the commercial aspects of the business".

As the company aims to achieve net zero greenhouse gas emissions by 2030, the next big challenge for its procurement department is to align itself more closely with the interests and development of the supply chain.

"The social agenda and the requirement, particularly with state projects, to show our social value is huge," Williams explains. "From employing ex-offenders to emitting less carbon, there are added complexities to factor into our buying decisions."

Instead of simply ditching suppliers that fail to keep pace with changing attitudes, procurement should help all parts of the supply chain to attain new standards with training and accreditation, she says. "By walking in the shoes of suppliers and asking them how events such as Brexit are affecting them, procurement can – and must – be part of the sustainability dialogue that our supply chain is having every day."

During the UK's first Covid lockdown, when the construction industry was still required to deliver new hospitals and other vital infrastructure, the know-how of procurement professionals proved crucial, Williams says. She cites the example of Grange University Hospital in Cwmbran, which opened four months early, below budget and without significant defects last November. This was just in time for it to help treat the second wave of Covid-19 infections in south-east Wales. With procurement departments helping suppliers to understand the pipeline better and providing all stakeholders with information about capacity, risks and opportunities, business-continuity plans could be managed far more effectively than they might otherwise have been.

Now that procurement must look beyond immediate price concerns to the long-term environmental effects of its choices, the whole profession needs to form a new mindset, according to Williams.

"Balancing all the different sustainability factors requires something new," she says. "We need robust ways of working, as well as skilled procurement professionals who can engage with designers, clients, suppliers and other key decision-makers to influence the best outcomes."

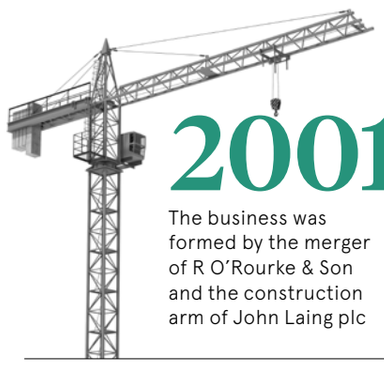
> **We may not have the 'grey beard' status that's accorded to men, but many older women in this industry have a wealth of knowledge and skills that can be hidden under the weight of caring responsibilities**

Williams also believes that her industry urgently needs to provide sustainable, inclusive and flexible employment for less traditional employees. With female representation in the UK construction workforce at only 13%, Laing O'Rourke's target of 50% by 2033 is, she believes, ambitious yet achievable.

While the equivalent figure in the procurement profession is 39%, research by Gartner suggests that the proportion of women in senior roles fell from 28% in 2019 to 21% last year.

Williams believes that women's extra caring responsibilities during the Covid crisis may have contributed to this decline, but she notes that older women are being left behind in the profession's recruitment drive.

"We may not have the 'grey beard' status that's accorded to men, but many older women in our industry have a wealth of knowledge and skills that can be hidden under the weight of their caring responsibilities," she says. "The reality is that too many experienced female professionals are finding that their careers are stalling just at the time when men of a similar age are gaining more promotions. I want to tackle the root causes of this issue."



2001

The business was formed by the merger of R O'Rourke & Son and the construction arm of John Laing plc

£73m

Pre-tax earnings for the financial year to March 2020

£8.2bn

Laing O'Rourke's ongoing order book as of March 2020

12,796

Number of employees in 2017-18

Laing O'Rourke, 2018

Q&A

Data powers better supply chain decision-making

Katie Tamblin, chief product officer at supply chain risk and performance management firm Achilles, discusses the vital role of data in improving supply chain resilience and decision-making, and reducing risk.

Q What has the Covid pandemic taught us about managing supply chain risk?

A Undoubtedly, the pandemic has shone a light on the fragility of supply chains, the impact of supply chain breakdown, and the importance of accurate data and resulting insights as tools to mitigate risk and manage supply chains.

For more than 30 years, Achilles has been helping companies manage supply chain risk and the insight we have gathered over this time tells us that there are two types of risk: reactive risk and resting risk.

Resting risks are ever present but, if identified proactively, can be managed in advance of any disruption. There are a number of lenses through which Achilles looks at resting risks in the supply chain, including financial, health and safety, environmental, social and governance. Our supplier scoring provides a benchmark as to how well suppliers are equipped to manage this type of ongoing risk, giving us unique expertise on the overall level of resting risk present in global supply chains and providing the foundation for the Achilles Supply Chain Risk Index (ASCRI).

Reactive risks are unpredictable and driven by events, such as the Covid-19 pandemic or the Suez Canal blockage. Requiring a quick reaction to manage the consequences and mitigate risk, the impact is often managed 'live' so access to dependable data is critical to success. The ASCRI layers event-driven risk factors on top of the underlying resting risk to deliver a comprehensive pulse on global supply chain risk.

Q The Q2 ASCRI has just been published, what is the data telling us?

A Having previously seen the fastest ever decrease in economic activity, we're now seeing that the recovery is very sharp as well, which is creating significant shortages. The pandemic forced production to shut down in a lot of areas but now people are coming back and spending again, demand is returning fast. That's great, but the production gaps have created hiccups in supply chains, making them more fragile than before. Major shortages in a number of areas meant the ASCRI measured 49.1 for the three months ending in June, as compared to a lower risk reading of 56.1 in Q1 (a lower index figure means higher risk). The seven-point increase in risk took our supply chain risk rating from moderate to high.

Q Which supply shortages do you see impacting markets over the next few months?

A There are plenty of trees being cut down but the sawmills that turn logs into a consumer product suffered production outages due to Covid and many still aren't operating at full capacity. This means sawn timber is in extremely short supply, resulting in price spikes and shortages.

Microchips and memory storage devices are another. A hangover from the increased demand for tech while the world worked and learnt from home, together with production being offline and higher prices for input metals, means there will be meaningful shortages and price spikes for several months yet. This has a wider impact as demand is shared across consumer and industrial electronics.

Our data from the ASCRI also confirmed back in June that the HGV driver shortage in the UK would cause supply disruptions - a consequence we are watching play out in the headlines each day. Global reductions in shipping reliability, as ports struggle with Covid-related shutdowns and increased demands, will also drive delays across all sectors.

Q What does the latest ASCRI data tell us about supply chain risk and resilience in the months ahead?

A The ASCRI data indicates that risk is growing in the construction and retail sectors, driven by supply disruptions across a range of building materials, microchips and HGV drivers. In addition to the timber shortage, the UK Construction Leadership Council is warning of shortages across a range of other inputs, including cement, electrical components, steel and paint. Price increases in fuel, particularly in the US, and key metal inputs to electronics will continue to pressure supply chains dependent on these in the coming months.

While input prices are expected to be at or near a peak, it will take months for raw material price increases to filter through to finished goods, meaning prices for manufacturing goods are likely to continue to rise and/or remain high.

Q Given this outlook, how would you advise businesses to act on this data?

A Companies that operate quickly and secure supplies earliest will weather the storm best. It might sound simple, but it needs to be said: supply is there until it's not and those that haven't locked in their channel of supply are typically left scrambling when supplies are short. For goods and services that are critical to your supply chain, it's important to develop relationships with suppliers so you can stay close to the individual situation.

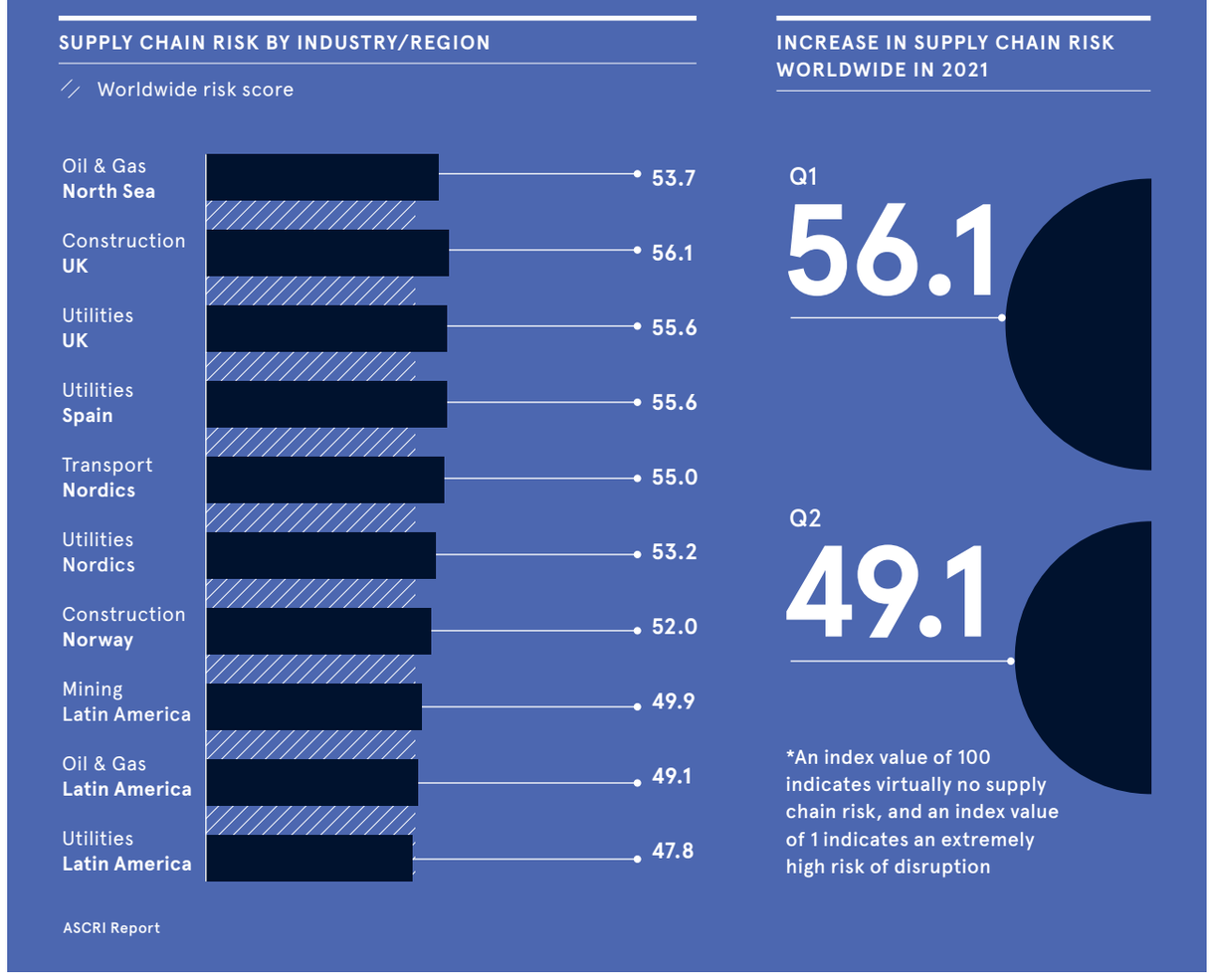
When the going gets tough, suppliers hold the upper hand and will typically choose to support those buying organisations where they have a strong, mutually beneficial working relationship. Using additional levers, like shorter payment terms and visibility into the future work bank, can help secure supply in a competitive situation, but I'd always advise businesses to do this proactively, not at the point of crisis.

Q How do you advise identifying alternative sources of supply without introducing additional risk to a supply chain?

A There is always going to be a fear when dealing with unknown suppliers, especially during periods of supply shortages, that you run into companies that cut corners, are less safe and don't produce high-quality products. Nobody wants to see an increase in counterfeit parts or modern slavery in supply chains because people are working with suppliers they haven't had a chance to vet as thoroughly as they would do normally. Achilles provides buyers with access to a pool of pre-vetted suppliers. Simply put, this means that if suppliers have been audited by Achilles, or demonstrated they have appropriate qualifications and certifications, they will deliver a quality product or service without introducing any undue reputational or strategic risk to your supply chain.

For more information, visit achilles.com

Achilles



Having served on more diversity committees than she can remember over the years, Williams continues to campaign for a fairer deal for women in the workplace. She believes that, by focusing first on inclusion and "valuing the contributions that anyone, of any background, can bring to an organisation", a more diverse workforce will ensue.

It's often the deeds of influential individuals in an organisation that create momentum, she says, citing one especially memorable intervention of her own. "Some years ago, I hired a female engineer for a commercial role, based on her talent and potential. At the time, that was widely seen as highly irregular and even risky. I firmly believe that actions create beliefs in opportunities and possibilities. In that case, a single appointment made a discernible difference to an entire organisation's attitudes to transferable talent."

Williams is the executive sponsor of a Laing O'Rourke subcommittee addressing the under-employment of disabled people, particularly the 80% whose impairments are hidden. A fellow of the Royal Aeronautical Society, she is fascinated by what Elon Musk – who has Asperger syndrome – has achieved "with no help from NASA". She believes that celebrating neurodiversity is the next big challenge.

"It shocks me that, more than a quarter of a century on from the Disability Discrimination Act 1995, only 16% of autistic people are employed, even though so many more are very capable and long to be accepted into the workplace," she says.

Williams argues that new ways of thinking about business problems should be sought by all organisations, particularly those experiencing skills shortages, although she adds that the stereotypical view of autistic men in particular as maths-loving geeks is unhelpful.

"Neurodiverse candidates are as varied and as individual as neurotypical ones. Neither group will benefit from a one-size-fits-all recruitment strategy," she says.

Other inclusivity subcommittees at Laing O'Rourke include those devoted to carers, single parents, and women dealing with the menopause.

Williams is accustomed to being the only woman in the room, especially in "meetings full of more junior men who all play golf". She says that, while male clubbiness can be irritating and even offensive at times, the situation has improved.

> **People often point out that I'm the sole woman in a gathering, but now I'm so engrossed in how other people's jobs relate to my own that I rarely notice**

"People often point out that I'm the sole woman in a gathering, but now I'm so engrossed in how other peoples' jobs relate to my own that I rarely notice," she says. "When I started work in the 1980s, 'nudge-nudge, wink-wink' sexual innuendo was the norm. If a few men today want to stay rooted in the past, that's their problem. But, for the most part, I'm encouraged by how many people have a fresher outlook."

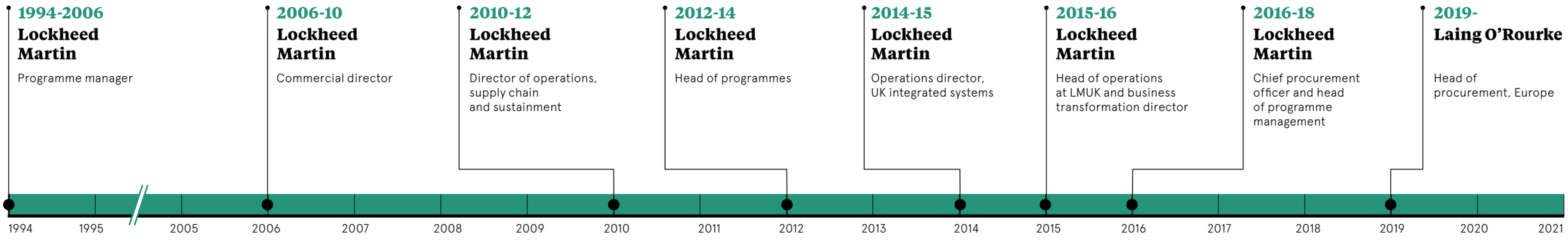
Having kept a low profile for many years – something that was encouraged in her previous sectors – Williams is happy to be more visible in her current role.

"I've picked up a lot of knowledge since those early days at the MoD. If I can use it to influence my industry across several fronts, I'll be glad," she says. "After all the recent disruption, procurement is taking a more strategic direction. As far as I'm concerned, this is long overdue."


Laing O'Rourke is part of the team that's delivering the main engineering works at Hinkley Point C, the first nuclear power station to be built in the UK for a generation

Laing O'Rourke

CAROL WILLIAMS' CAREER PROGRESSION

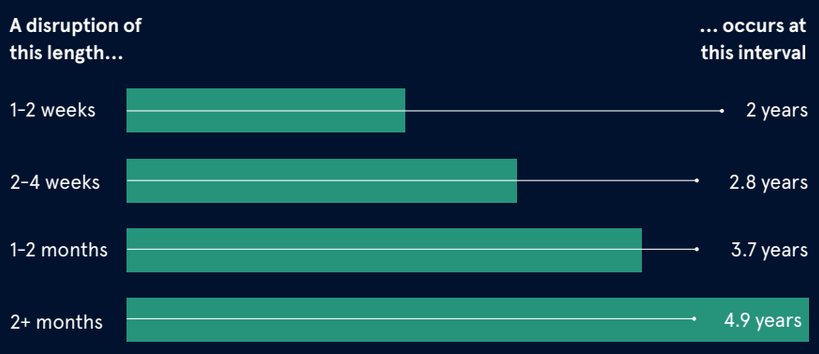


RESPONDING TO DISRUPTION

Supply chains have suffered a series of disruptions in recent months, ranging from Brexit and Covid-19 to the Suez Canal blockage and the HGV driver shortage. So-called black-swan events are seemingly becoming more regular occurrences, which makes the ability to respond and recover quickly from them increasingly crucial for any business seeking a competitive edge

SUPPLY CHAIN SHOCKS ARE BECOMING MORE FREQUENT AND SEVERE

Frequency of supply chain shocks



McKinsey, 2021

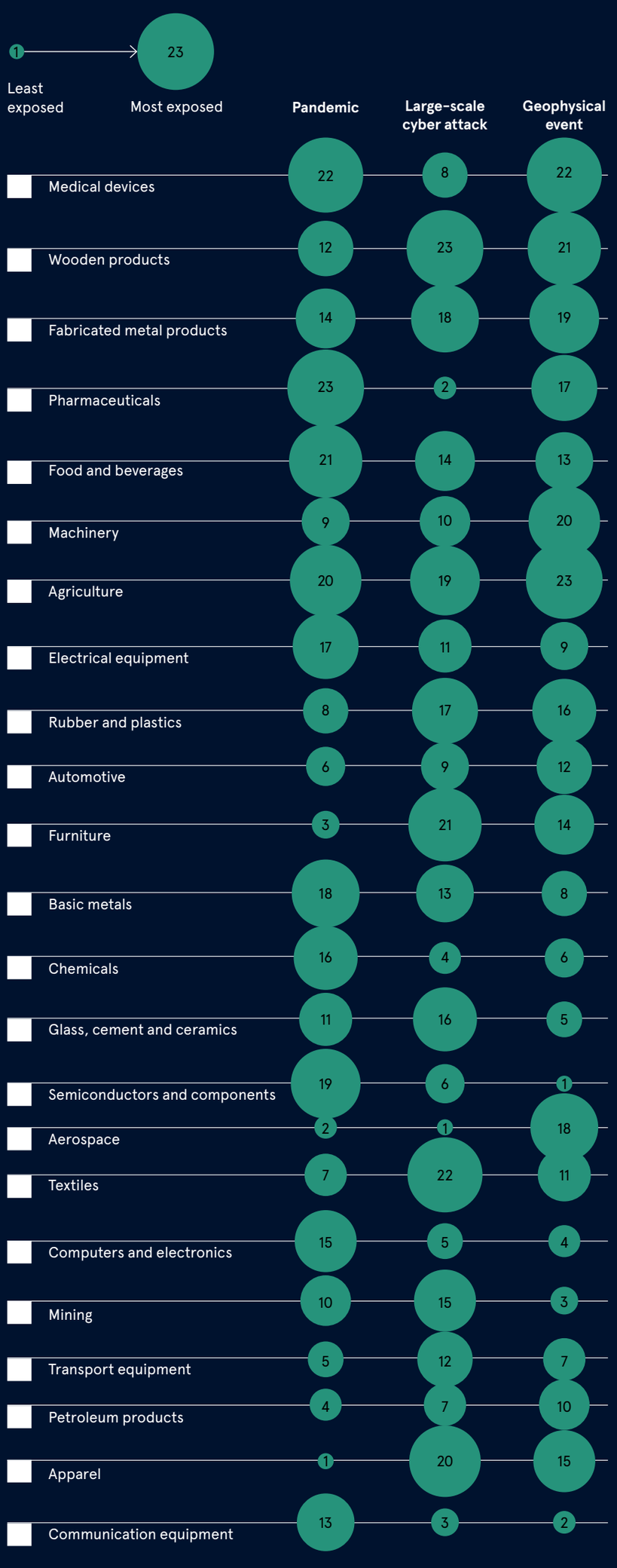
39%

of companies rate supply chain disruptions as extremely or very challenging for them

MHI, 2021

SUSCEPTIBILITY TO SUPPLY CHAIN DISRUPTION VARIES SIGNIFICANTLY ACCORDING TO THE SHOCK AND THE SECTOR

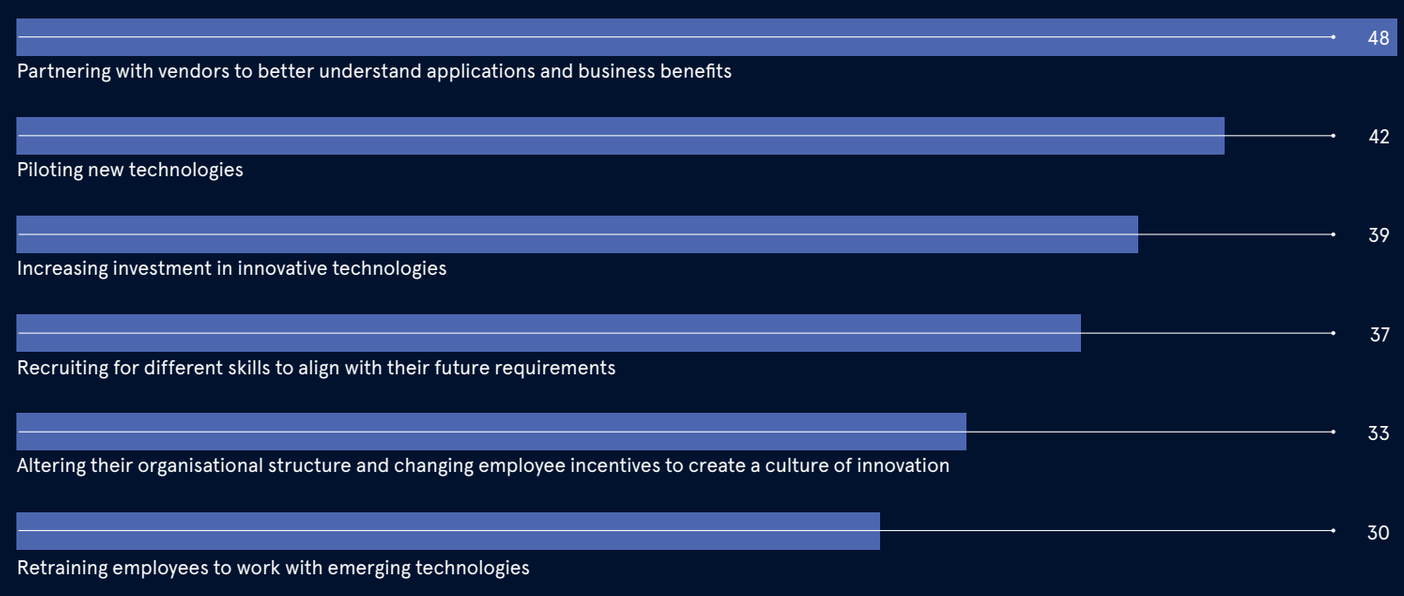
Rankings of supply chains' exposure to shocks in 2020



McKinsey, 2021

COMPANIES ARE TAKING ACTION TO PREPARE FOR CHANGES OVER THE NEXT 10 YEARS

Percentage of companies taking the following actions



MHI, 2020

62%

of global CXOs believe that there will be future disruptions on the scale of Covid-19

Deloitte, 2021

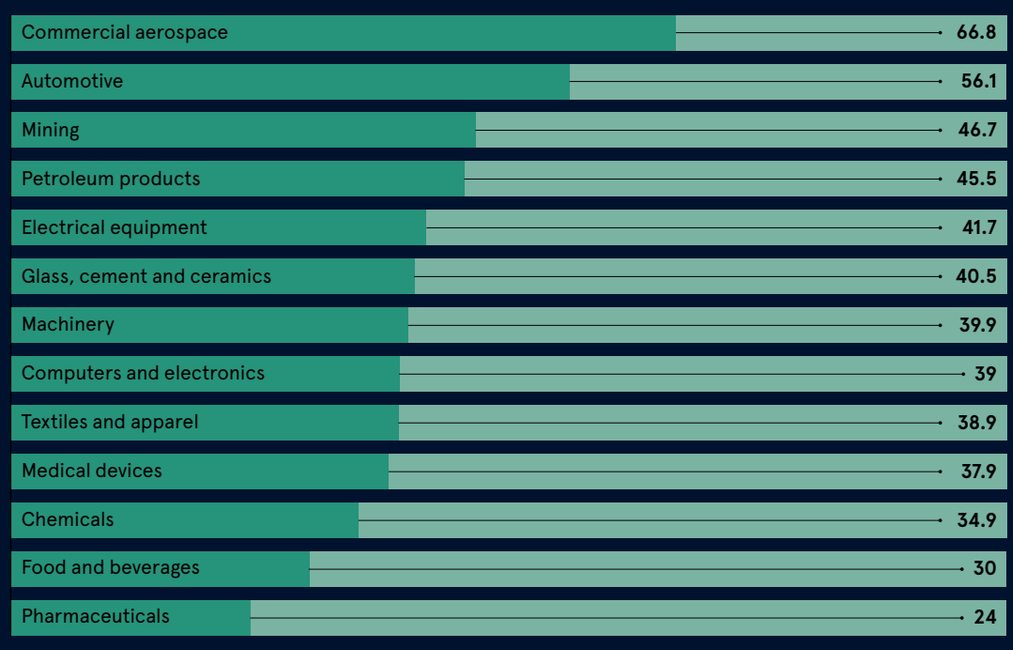
42%

the amount companies can expect to lose of one year's Ebitda every decade owing to supply chain disruptions

McKinsey, 2021

LOSSES FROM SUPPLY CHAIN DISRUPTIONS VARY FROM SECTOR TO SECTOR

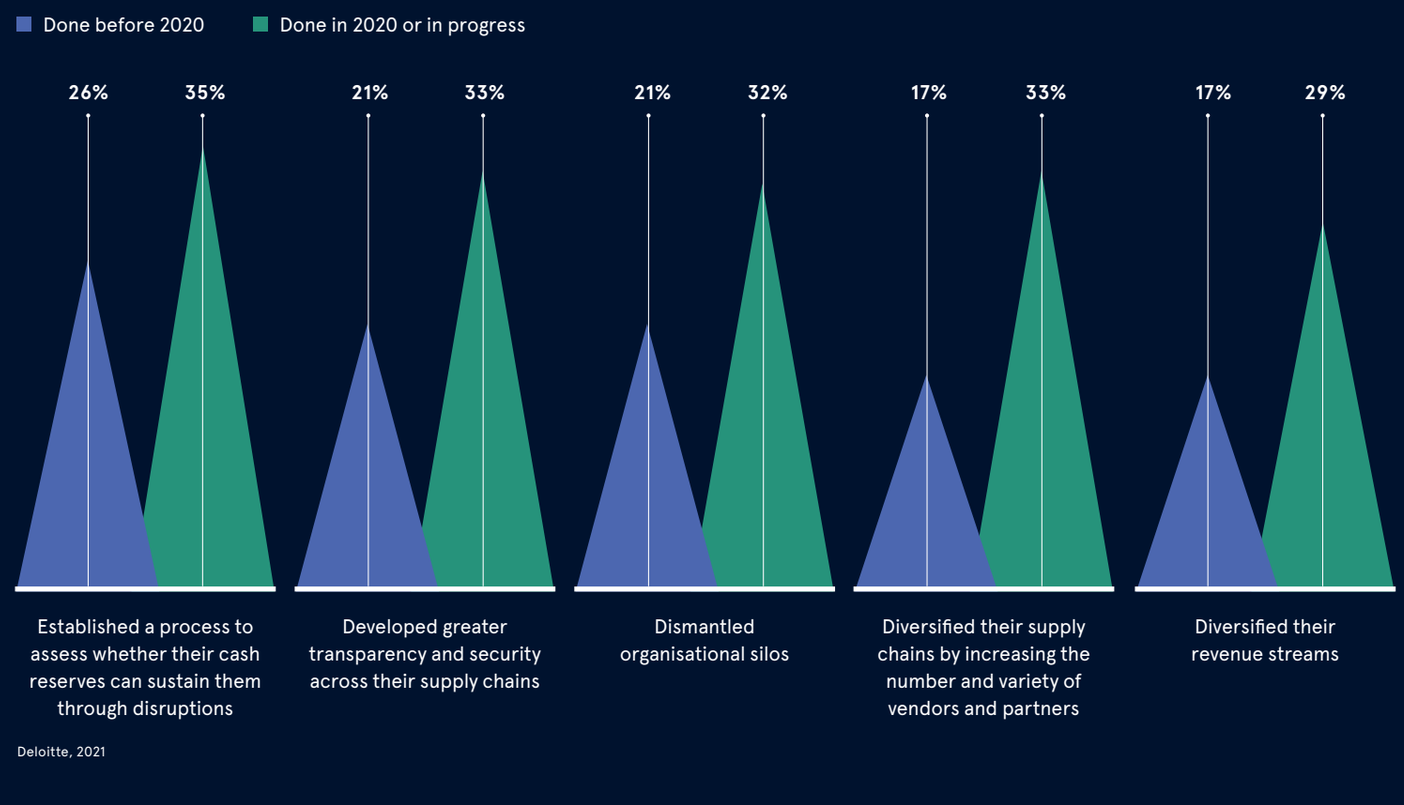
Net present value of expected losses over 10 years (% of annual Ebitda)



McKinsey, 2021

2020 DISRUPTION PROMPTED MANY BUSINESSES TO INVEST IN PREPAREDNESS

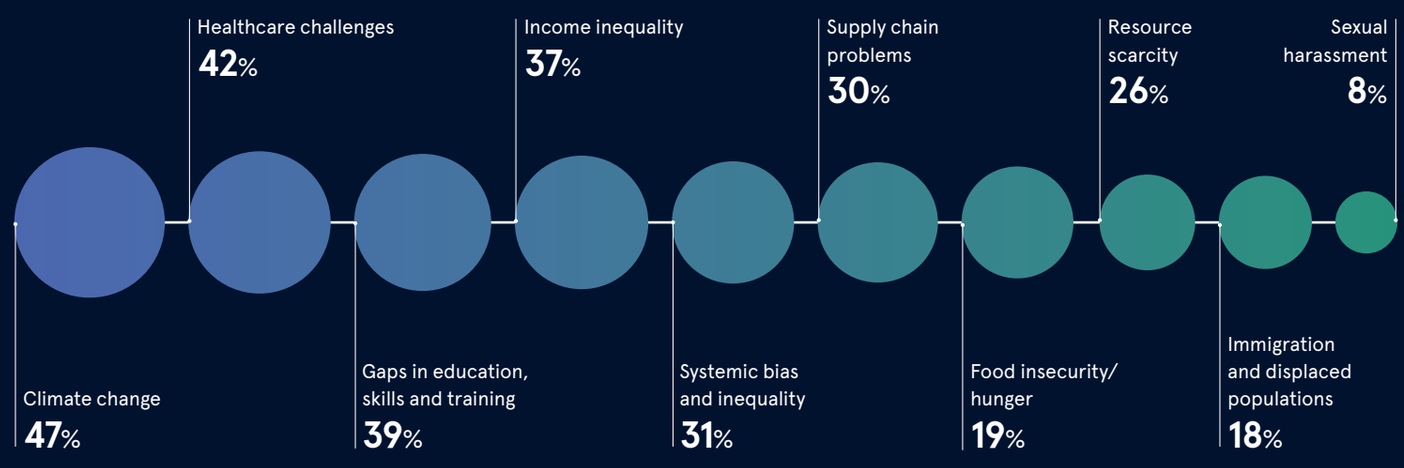
Percentage of organisations that have implemented the following to prepare for disruptive events



Deloitte, 2021

THE BIGGEST SOCIETAL CHALLENGES FOR THE PRIVATE SECTOR OVER THE COMING DECADE

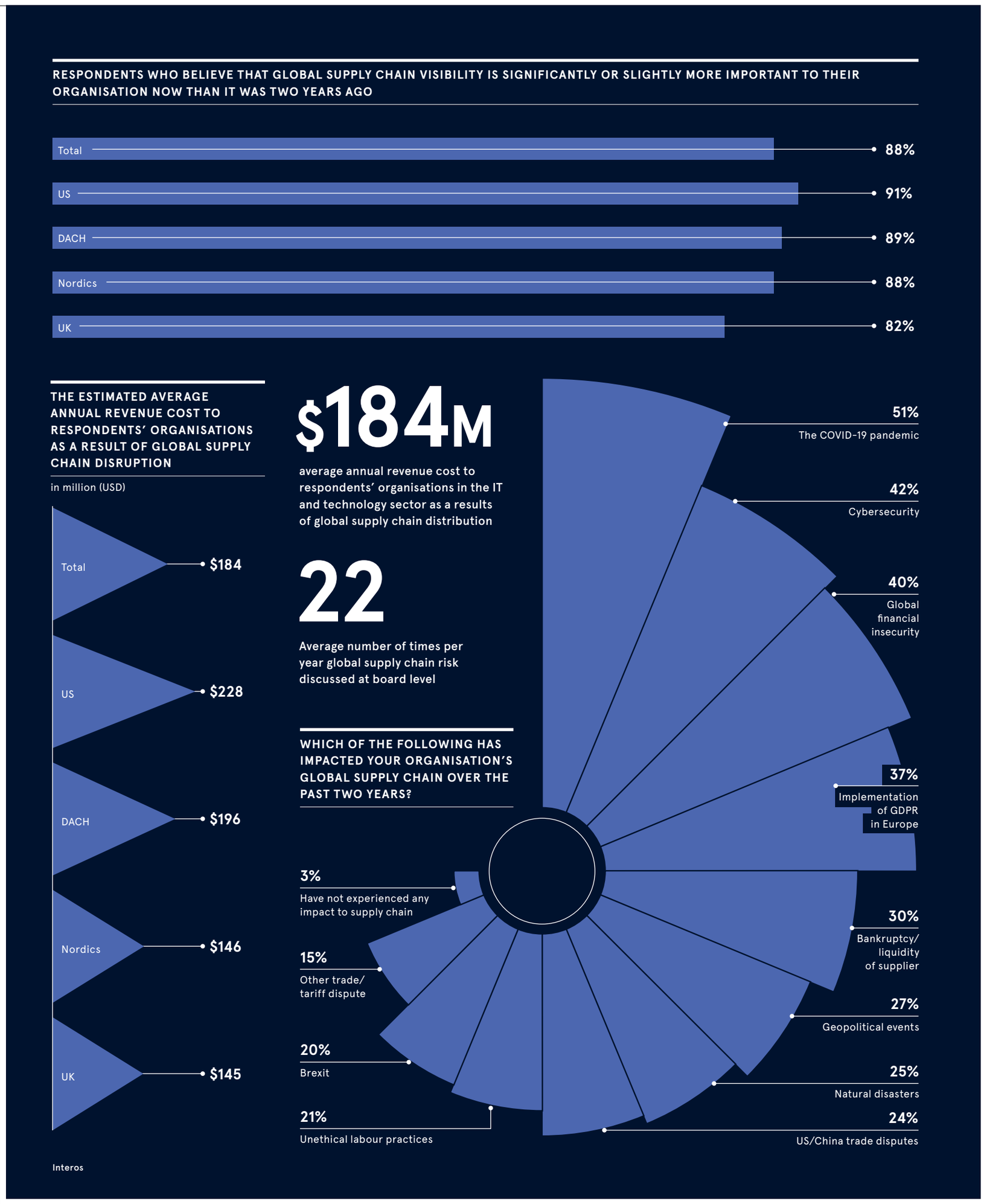
Percentage of CXOs saying the following problems are critical for businesses to tackle



Deloitte, 2021

From fragile to agile – transforming the supply chain

With global supply chains pushed to the breaking point over the last 18 months, companies must transition from traditional just-in-time processes to a resilience-first model



FIVE KEY FINDINGS

88%

of supply chain leaders say visibility into their global supply chain is more important now than two years ago

$184M

a year on average, cost of global supply chain disruptions for large companies

83%

reported that their firm has suffered reputational harm as a result of supply chain disruption

66%

are not currently assessing their global supply chain on a continuous basis

74%

still use manual methods

Vanson Bourne, 2021

The world has gotten a crash course in supply chain management in recent years. The question now is how do we respond? The cold hard costs and deeply felt impacts of supply chain disruption have elevated the issue as an urgent business priority. The hyper-connected nature of the global economy has meant that, from Covid-fuelled supply shortages to cybersecurity attacks, when supply chains are hit the ripple effects spread fast and far.

So much so that global supply chain disruptions are now costing large companies $184m a year on average, according to a recent study by Interos, the operational resilience company. Nearly all (94%) of the 900 senior IT, security and procurement decision-makers surveyed reported some negative impact to revenue resulting from supply chain disruption. They cited a variety of supply chain risks including cyber breaches, financial risks and ESG (environment, social, governance) transparency issues.

A board-level challenge

Crucially, supply chain shocks don't just impact revenue and profitability. They can also be damaging to public perception and confidence. 83% of survey respondents reported that their firm has suffered reputational harm as a result of supply chain disruption. Meanwhile, corporate boards are newly focused on what's happening behind the dashboards, asking the C-suite difficult supply questions 20 to 24 times a year, according to Interos's research.

"In the past we worked primarily with procurement and compliance teams. Now everyone we partner with at companies are in the C-suite. Supply chain issues are landing on CEO and board desks more so than any time during my 25-plus years in this industry," says Jennifer Bisceglie, founder and CEO of Interos, whose AI-powered platform maps, monitors and models global supply chains. "But also, for the first time, ordinary people are talking about supply chain problems. The Covid-19 crisis meant they couldn't get vital cleaning supplies and toilet paper. That suddenly made it personal.

"There's growing acknowledgement that every business is only as strong as its supply chain. It's the fundamental enabler of any company's mission, day-to-day operations and long-term growth agenda. If you look at what's happening with ESG goals, too, executive compensation is now being tied to supply chain metrics. There's heightened awareness of just how important these unseen global networks are to a business."

Though the fragilities exposed in supply chains during the pandemic were stark, it's important for organisations to realise, and explicitly acknowledge, that those supply chains performed how they were built to operate – short, tight and just in time. The flaws in traditional supply chain processes, which significantly lack visibility, were evident previously, but it took a black swan event in the form of a global pandemic to finally break them.

Optimising at 'click speed'

Designed for efficiency at the cost of fragility, the breaking of global supply chains now presents an opportunity to rebuild them for strength, agility and resilience. We've seen the extent to which markets rely on supply chains not just to deliver products – but to stabilise and secure the wellbeing of people's livelihoods. Truly resilient supply chains that thrive in a hyper-connected economy can't be achieved overnight, however. Building a safer and more secure global economy requires an intellectual, cultural and government policy shift. It must be led from the top as a board and government priority with shared responsibility across the C-suite and national leadership, alongside investment in the technologies that power intelligent supply chains.

> **The future of the supply chain is true operational resilience. That means pre-planning for disruptions so that when the unexpected happens, you already know how to respond. The companies that understand and act on this intelligence will be at an advantage**

"Supply chains must be continually optimised at 'click speed' because that's how events and customer demand happens globally. Supplier relationships are extensive, connecting one company to the next across multiple layers. Understanding how to track and leverage that hyper-connectivity as a strength is key," says Bisceglie. "Ultimately, these vast networks are a big data problem. They're not something that can be analysed by humans any more using annual surveys or other manual tools. The solution comes down to artificial intelligence. It's a 24-7 technology with no lag time that can process large data sets so organisations can see and pre-solve disruptive incidents."

Powered by AI and machine learning, Interos is reinventing how organisations manage their supply chains through the company's Operational Resilience Cloud. It can model the entire ecosystems of complex businesses, down to any single supplier, into a living global map. By vastly enhancing visibility across the supply chain, Interos helps reduce risk and avoid disruption, while also uncovering new opportunities for companies to benefit from supplier relationships.

Mapping the sub-tier

The technology not only continuously maps sub-tier relationships in an organisation's supply chain, but also monitors global events that might impact their business. Using AI, it helps organisations understand who is in their supply chain, the implications of those relationships, and whether any actions are required.

"We do that every day – map, monitor and model," says Bisceglie. "The core idea from an operational resilience perspective, is to be able to pre-solve or pre-empt costly disruptions. Over the last 18 months with Covid, we discovered the true threat posed by concentration risk, an over-reliance on certain organisations or countries. It also laid bare the financial instability of our supply chains.

"You can also look at global cyber breaches, such as SolarWinds, where an attack on one rapidly became a breach of global proportions. Or consider the Suez Canal crisis, which demonstrated the enormous global impact of a single ship stoppage. When one of these activities occurs we need the ability to understand how it affects our supply chains and what to do, in real time. The future of the supply chain is true operational resilience. That means pre-planning for disruptions so that when the unexpected happens, you already know how to respond. The companies that understand and act on this intelligence will be at an advantage."

Bridging the gap

Jennifer Bisceglie, founder and CEO of Interos, which recently gained 'unicorn' status following its Series C funding round, outlines the importance of diverse leadership

Q Your company has thrived during a period of inability. What advice do you have for other leaders still working through hard times?

A Our success is based on focus. The company is 17 years old. Like any startup, we've overcome challenges to get to where we are. We've always stayed singularly focused on solving the problem of transparency in the supply chain to help organisations pre-solve problems and create more value from their relationships. Some entrepreneurs suffer from 'shiny penny syndrome', where you're constantly distracted by new ways to grow revenue. My advice is to maintain focus and have the fortitude to understand you're on the right path and solving a real problem. When I graduated college, I was introduced to the nexus of technology and supply chain, and I identified a clear gap. Everyone was focused on technology within the supply chain and within the company but not between businesses themselves. Those relationships have important implications for who can ultimately access your products or services. We never lost sight of that gap.

Q As one of the few female founders who has built a unicorn business (valued at over $1bn), what would you say to other women aspiring to that success?

A I'm a big fan of the saying 'if you can see it, you can be it'. The fact that Interos was able to achieve unicorn status comes down to two things. One is realising this is just the beginning of our journey. It's certainly not the end. Being a unicorn comes with significant responsibility to build and grow your valuation. The second thing, for the leaders coming after us, is now you know it's possible. Surround yourself with true believers in the mission and appreciating the fact that this can happen to you is important. I just wanted to be the best leader, female or otherwise. I truly believe that we all have that opportunity.

Q What should other tech companies be doing to bridge the gender gap?

A We're seeing different countries and companies globally passing laws to enforce diversity benchmarks, which is positive. These actions must be purposeful and supported by defined tracking processes. I believe if you can't find the right candidate for a role, you should be thinking about how to create a pipeline, outside of your traditional channels if necessary, so you can educate, elevate and mentor the diversity into that role. There are multiple ways to get at diversity and it can't simply be a compliance activity. Diversity of people, experience and thought strengthens companies and drives innovation. It's an ongoing goal, not a one-time activity. It's incumbent on all of us and it's something we take very seriously at Interos. We have a target of a 50-50 gender split by 2025. We measure that in our quarterly board meetings. Even though we're not a big company we believe in it and have set that mandate.

Q What are your thoughts on the growing concerns over ethical supply chain behaviour – are we really poised for change?

A We're starting to see change, not least because there are now executives in listed companies whose compensations are directly tied to ethical supply chain behaviour. We're seeing that top-level story in the press, but I think the follow-up audit and execution still needs to be reported on. It's moving in the right direction, however. I also think it's interesting, as you look around the world, that different regions define it differently. In EMEA we typically see emphasis on carbon footprint. In Africa, child labour is a chief concern. And in the United States it's more focused on supplier diversity. Giving different regions the power to make an impact is so important, and measuring and reporting their gains is just as essential.

> **Diversity of people, experience and thought strengthens companies and drives innovation. It's an ongoing goal, not a one-time activity**

We're also seeing progress when companies are ready to go public. Ethical supply chains are no longer given passing mentions in 10-K filings; it's something companies analyse and report out. Supply chains become a source of competitive advantage as companies invest in them. There's increasing exposure at the retail level as well. Many websites, especially consumer sites, allow people to understand the exact provenance of a sneaker or their coffee beans. Think about how that empowers them. They're able to drive ethical sourcing and supply chain transparency by buying into companies who prioritise it. We're going to see much more of this transparency underpinning company reputation and performance in the future.

Commercial feature

Battersea Power Station and INFORM keep London's roads free of traffic jams

Battersea Power Station deploys intelligent planning software to manage logistical challenges of £9bn project

Battersea Power Station has been a London landmark for 90 years. Decommissioned in 1983, the Grade II*-listed power station in the heart of London has adorned the front covers of music albums such as Pink Floyd's Animals and been the backdrop for many films and TV series, from Hitchcock's Sabotage to the BBC's Sherlock. Today, Battersea Power Station is at the centre of one of the largest and most impressive development projects in Europe.

Since 2012, Battersea Power Station Development Company (BPSDC) and its shareholders have been transforming the 42-acre site – the size of 24 football pitches – into an exciting new riverside destination for London that will provide 4,239 new homes, shops, restaurants and cafés, as well as office space, leisure and fitness facilities, a hotel and more than 19 acres of public space. 2021 is the most exciting year yet in the development's history as the countdown to opening the Power Station's doors to the public next year begins. The Grade II* listed building's first residents moved into their homes in the Spring, retailer and office occupiers will begin fitting out their spaces in the coming months and Battersea Power Station's new underground station will open in autumn 2021 as part of the Northern line extension, bringing Battersea within 15 minutes of the City and the West End.

Decision-making software in logistics

The Battersea Power Station development is structured into eight phases, each designed by world-renowned architects, with an overarching strategy across all phases. In addition to the restoration of the Grade II*-listed power station and the reconstruction of its four iconic chimneys, several buildings will be completely new. As a result, the logistics of the construction project are extremely complex.

With up to 400 trucks arriving daily with tools and materials for the site, it is vital to ensure work can continue smoothly across every phase of the project. Moreover, the material must always be delivered to exactly the right loading point in line with requirements.

For this reason, the project deployed intelligent logistics system SYNCROSUPPLY from optimisation specialist INFORM to manage traffic and loads, as well as to save London's streets from potential traffic jams caused by the 10,000 trucks registered each month.

BATTERSEA POWER STATION DEVELOPMENT

£9bn
project

42acres
on the south bank of the Thames

8
construction phases

4,239
new homes being created

19+ acres
of public space

Demands on logistics

The biggest challenge was to optimally use the gates, loading points and resources of the construction site to prevent traffic jams. Previously, important planning data from carriers, suppliers and construction companies all needed to be centrally managed. Additionally, the layout of the construction site changes every week as construction progresses.

In the past, delivery traffic was only planned up to the gate. It wasn't possible to account for whether a specific loading point on the construction site was occupied or whether the right resources, such as cranes, lifts or other construction site equipment, were available to unload a truck's load. With the enormous number of daily deliveries and the distribution of responsibilities among the various construction companies, the individual schedulers could no longer manually monitor whether it made sense to deliver a truck at a specific time, what freight was needed where, or what throughput times could be expected when. However, the tight and varying space conditions on the construction site do not allow for errors.

"The INFORM system was selected for its ability to transcend construction deliverables into an operating campus and is now being utilised to complete the programme of works, while managing our retailer and residents' delivery requirements in this new mixed-used destination for London," says Duncan Pickard, head of programme management and delivery at BPSDC.

"Using the system at Battersea Power Station has enabled us to match lifts, hoists and cranes to each delivery and review the optimisation of each."

SYNCROSUPPLY offers two complementary modules: time slot management and truck supply control. Both employ intelligent decision-making algorithms based to optimise business processes within seconds. The former enables forwarding agents to book time slots via a central online platform.

The software provides dispatchers complete transparency about which trucks and loads will arrive where and when, and about the capacity utilisation of the resources required for unloading at that time. The system also stores information on when materials are to be delivered. After all, some orders must be placed months in advance and adapted to the requirements of the different construction phases. Even the weekly updated construction site plan is integrated into the platform and can be consulted for the purpose of planning. By means of the integrated network editor, the planners can independently add or disable plannable loading points at any time.

Time slots can be accepted accordingly or, if required, allocated automatically according to the availability of resources. These include freight elevators or more than 15 cranes, each of which has its status recorded in the system. To avoid traffic jams or obstructive allocations, only those that stick to the plan are admitted to the site.

"This is how we can provide BPSDC with planning security and full transparency regarding supply traffic," says Matthias Wurst, director manufacturing logistics systems at INFORM. "Our time slot management helps to coordinate non-construction traffic around the development site. We also assign optimised time slots for deliveries to retailers already located in the area, private moving traffic of new residents and parcel services, so that all stakeholders will reach their destinations as desired."

SITE LOGISTICS

Up to
400
inbound trucks daily

10,000
trucks registered each month

15+
cranes

Dealing with any disruption

But any plan is only as good as the flexibility needed to deal with everyday disruptions. This is what SYNCROSUPPLY's intelligent truck supply control is for. If forwarding agencies report a delay, within seconds the system can take these deviations into account, recalculate suitable parking and unloading locations, and inform all parties involved about the changed circumstances.

In the future, the data on throughput times and the duration of the unloading process will be used to further optimise planning.

There is also a requirement to document CO_2 emissions from the many construction site vehicles. SYNCROSUPPLY helps by using data about the vehicles, freight, distances and driving hours to calculate the emissions caused by each trip.

Several other requirements are also in place in the UK, such as the national standard Construction Logistics and Community Safety (CLOCS) and the voluntary Fleet Operator Recognition Scheme (FORS).

With a peak of 140 vehicles per hour accessing the site via two, short, public feeder roads, traditional delivery management systems that merely scheduled gate times were inadequate. SYNCROSUPPLY has proven to be a powerful tool at Battersea Power Station that virtually eliminated on-site delays and significantly improved the flow of materials to the points of use despite high demand and limited vehicle access.

For more information please visit inform-software.com

INFORM

SUSTAINABILITY

The greener mile

The final stage of delivering a product to the customer is troublesome from an environmental perspective, particularly in urban areas, but eco-friendly solutions are being developed apace

Chris Stokel-Walker

We have become a nation of Veruca Salts since the Covid lockdowns forced us into etail therapy. More than a quarter (26.1%) of the UK's retail sales went through digital channels in June, according to the Office for National Statistics – and, when we buy online, we tend to adopt Salt's refrain from Charlie and the Chocolate Factory: "Don't care how, I want it now." Next-day, if not same-day, delivery has become an expectation rather than an optional extra.

This level of demand affects every part of the supply chain, but the most obvious impact is felt in the last mile of the delivery process. Our already congested towns and cities have become even more clogged with oversized vans, doubled parked or idling on yellow lines as couriers race to drop their cargo before the next traffic warden appears.

In a report entitled *The Future of the Last-Mile Ecosystem*, the World Economic Forum warned that, in order "to satisfy customers' ever-rising desire to buy products online, without any intervention, the number of delivery vehicles in the top 100 cities globally will increase by 36% until 2030. Emissions from delivery traffic will increase by 32% and congestion will rise by over 21%." Given that it was published in January 2020, this grim forecast does not even take the pandemic's considerable impact into account.

Despite the clear ecological ramifications, consumers are unlikely to lose the taste they have acquired for fast etail. More sustainable solutions are therefore required to ensure that our demand for convenience doesn't cost the Earth.

"This is a complex problem that links back to the high number of motor vehicles in urban areas," says Dr Ersilia Verlinghieri, senior research fellow at the University of Westminster's Active Travel Academy.

A report that she co-wrote for environmental charity Possible in August 2021 proposes replacing delivery vans, 96% of which are diesel-engined, with electrically assisted cargo bikes to reduce congestion, increase delivery efficiency and improve air quality. It estimates that an e-bike's lifetime carbon footprint is no more than 12.5% that of a diesel van.

Raleigh, one of the world's biggest bike manufacturers, offers a range of electric bikes called Stride E-Cargo. Their batteries can provide 40 miles' worth of assistance to the rider's pedal power on one charge, which takes less than five hours. The most capacious model in the range, priced at £5,950, is a trike with a 900l box over its front wheels that can carry up to 100kg of cargo.

Although Raleigh has only recently launched these products, its MD, Lee Kidger, noted when he unveiled the new range in July that 100,000 electric cargo bikes had been sold in Germany over the previous year.

DHL's delivery arm is adopting e-bikes in pursuit of its goal of achieving net zero carbon emissions by 2050.

"Providing an efficient last-mile delivery service requires a careful balance of cost, speed and environmental impact. In the city centre, there is a need for deliveries to be greener and also quieter, as they pass through built-up areas," says the company's CEO in the UK and Ireland, Ian Wilson. "We are reducing the number of vehicles on the road by replacing them with an environmentally sound alternative that's fast and efficient too."

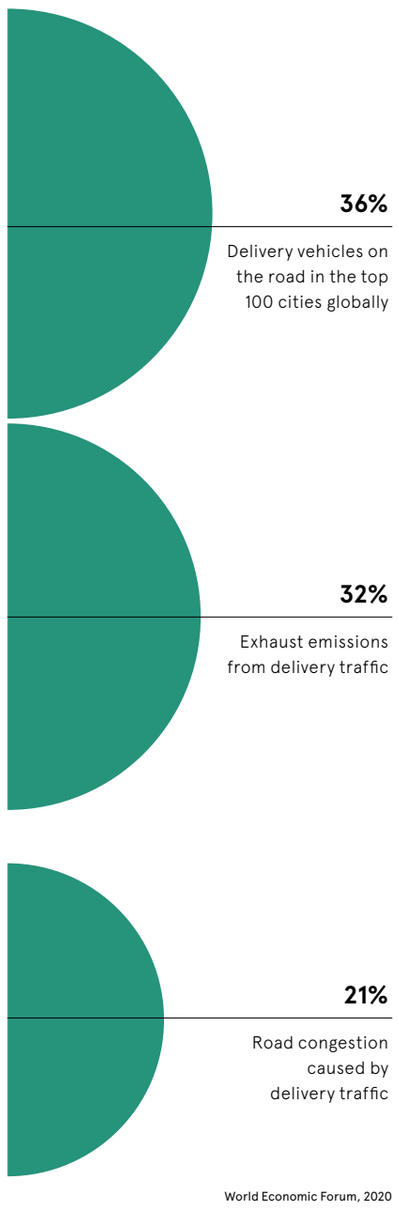
Among other initiatives to reduce its environmental footprint, DHL has started a riverboat parcel-delivery service that uses the Thames as a congestion-free route through central London.

The company and several of its rivals are also investing in electric vans. These still form a tiny proportion of the UK's total van population, but they look a surer bet than some of the more out-there vehicular concepts, such as drones. Amazon's Prime Air arm started developing these in 2016 but it was recently closed, with the loss of more than 100 jobs.

Other delivery vehicles that don't clog up the roads include the six-wheeled robots, designed by US company Starship Technologies, that the Co-op is trialling in Milton Keynes and Northampton. The supermarket chain's objective is to have more than 300 of these semi-autonomous devices travelling footways around the country by the end of this year.

THE NUMBER OF DELIVERY VEHICLES IS ON THE RISE

Forecast percentage increase by 2030



36%
Delivery vehicles on the road in the top 100 cities globally

32%
Exhaust emissions from delivery traffic

21%
Road congestion caused by delivery traffic

World Economic Forum, 2020

> **Providing an efficient last-mile delivery service requires a careful balance of cost, speed and environmental impact**

Tackling the last-mile challenge has also required delivery companies to rethink where certain facilities are best located. For instance, Verlinghieri says, "having a consolidation centre on the outskirts of a city, where goods can be dropped off by large commercial vehicles and passed on to electric vans or bikes, is an option".

DHL's approach has been to create more pick-up and drop-off points closer to its customers, as Wilson explains: "To meet the requirements for more flexibility in the last mile, we've installed a large number of service points and lockers across the UK where parcels can be collected or returned at the customers' convenience."

These so-called micro-fulfilment centres – several of which are repurposed inner-city shops that have lain dormant during the pandemic – can have a macro effect on last-mile emissions. A new report by Accenture, *The Sustainable Last Mile*, estimates that their use in London could cut the capital's delivery traffic by 13% before 2025. Customers must still visit their local centre to collect purchases, of course, but their journeys should be so short that a large proportion can be made on foot or by bike.

It's clear to Kidger that the last-mile problem requires a multi-pronged, collaborative solution.

"I don't think that cargo bike manufacturers can manage that alone," he says. "Teaming up with logistics companies, which understand where hops [between vans or bikes] need to be to get that last mile right, will be vital."

The supply chain silver linings playbook

The supply chain has had more than its fair share of challenges over the last 18 months, but **Lynn Torrel**, chief procurement and supply chain officer at Flex, says there is still much to be optimistic about

For supply chain professionals, it has been a challenging 18 months.

A myriad of issues has plagued the global supply chain, including obvious obstacles like the pandemic, chip shortages, and extreme weather, as well as not-so-obvious issues, such as shipping container shortages. Global supply chain teams have worked tirelessly to ensure material is available so products can be built, shipped, and available to purchase with minimal disruptions to the consumer.

Supply chain professionals have the unenviable task of making this happen while managing a highly fluid global environment that evolves daily. It's been challenging to say the least, but global supply chains will emerge revitalised, optimised, and more resilient in the long term. It might be difficult to think this is possible as the industry struggles to "survive the day," but there are transformative changes happening behind the daily chaos that will shape the world of business for decades to come.

The past 18 months have demonstrated the critical value of supply chain management strategies to global businesses. Over the past decade, the industry leaned out the supply chain to improve working capital velocity but, in doing so, made it so brittle that minor disruptions caused shockwaves. A giant boulder was dropped on everything in 2020, and it was so impactful that it forced supply chain professionals to reevaluate many strategies that they had built and implemented.

But it is not just supply chain professionals going through a reevaluation process. Executive teams and boards of directors are doing the same thing and understanding the critical role supply chains play in the success of a business. Fortunately, as a diversified manufacturer, Flex has always understood the critical role the supply chain plays in both our and our clients' success. These past 18 months have also shown our clients that supply chain operations are a competitive differentiator. Supply chain professionals now have a seat at the table from the very start because it is understood that how materials are sourced and supplied are just as critical as how the end products are manufactured and delivered.

> **Supply chain professionals would be wise to heed Winston Churchill's advice, 'If you're going through hell, just keep going'**

We've spent the last decade learning how to manage global supply chains, primarily with Asia as a central hub. Beginning last year, many industry leaders predicted that the volatility of worldwide supply chains would lead many businesses to implement regionalisation initiatives. The logic was that companies want to build products closer to their customers to reduce freight and logistics risk. Our team has seen this already begin to happen with a few clients in a couple of markets. We expect to have conversations with many more clients in the months and years to come as they look for ways to minimise risk and speed up production.

It's not an easy decision for most businesses. Supply chain professionals can't simply snap their fingers and relocate their entire manufacturing, assembly, and freight operations to another region. A significant amount of time and money must be invested to analyse if a regionalised supply chain would deliver value over time. There are also many additional variables, including constraints on cost and labour availability and the organisation's ability to manage the complexity of the transition and ramp up without disturbing overall production. In the end, a return to a decentralised regional supply chain could remove layers of complexity and improve time-to-market, but there will also be cost increases.

What a time to enter the workforce for the graduation classes of 2020 and 2021! As entry-level supply chain professionals take their first jobs, these historically adverse times will provide a substantial test of their aptitude and stamina. At Flex, we're seeing our team rise to the challenge for our clients and flatten their learning curves to keep up. We're living through an event whose impact will reverberate for generations, and these recent graduates are in the trenches with experienced leaders to develop creative solutions for supply chain challenges.

A big reason why these entry-level professionals ramp up so quickly is because of businesses' ability to offer remote onboarding and training. Rather than traveling to a manufacturing site, see the manufacturing processes, and gain a thorough understanding of the supply chain's role, trainees now dive into online training courses from the comforts of their home office. Similarly, remote work enables supply chain leaders to provide advanced learning sessions to highlight current difficulties their teams are working through or other lessons with real-world applications. All hands are on deck, so it's a great time to enter the field.

I'll admit that one of the things that concerned me early last year was how my job would translate to a remote environment. I had just joined Flex, regularly traveled to our major facilities and held in-person town halls to familiarise myself with our global workforce. That all stopped when international travel was eliminated to help reduce risks.

While facetime and touring facilities are critical components of my job, the ease and efficiency of video meetings and remote work have opened my eyes. In many ways, relationships with my colleagues, suppliers, and customers strengthened while working from home. Rather than meeting once a quarter for an in-person meeting, supply chain professionals meet with their peers multiple times a week to help and support one another.

This last part is especially vital as we navigate through this global crisis. Supply chain professionals leveraged video meetings to aggregate and manage significant issues quickly. As we've seen, each country has had its unique challenges containing Covid-19 outbreaks and managing its vaccine rollout. These changes had immediate impacts on the supply chain and required frequent collaboration between cross-continental teams. Working so closely together creates a more collaborative and transparent working environment that is critical to success.

This global supply chain stress test is identifying weaknesses in our systems that likely wouldn't have emerged otherwise. Intelligent supply chain professionals are staying positive and using these challenges as an opportunity to find new solutions to emerge wiser and more robust than they ever thought possible.

Supply chain professionals would be wise to heed Winston Churchill's advice, "If you're going through hell, just keep going." It can be difficult to see the light at the end of the tunnel during a tumultuous time, but if you step back and look at the past 18 months you can see organisations have implemented new technologies and policies that will power their businesses for years to come.

Find out more about Flex's supply chain expertise at flex.com/supply-chain

flex

EXPERTISE

How to find the right mix of people and technology in supply chains

Automation brings many benefits, but human expertise remains crucial for success in logistics

Maria Highland

Klaus Vedfelt via GettyImages

For many people in the UK, the past 18 months have largely comprised working remotely, shopping online and watching lots of Netflix shows. Each of these activities is made possible by digital technology, which shapes a wider theme of this period: digital transformation.

US firm Coyote Logistics recently published a research report entitled *Supply Chain Automation in a Post-Covid World: how to balance people and technology in logistics operations*. Unsurprisingly, this revealed that the Covid crisis accelerated the sector's adoption of digital technologies in 2020. But it also found that both shippers and carriers were relying more on human expertise than they had been the year before. In 2019, shippers had told the researchers that the ideal balance between people and technology was 39:61, while carriers had said that the ideal was 41:59. In 2020, the balance shifted to 42:58 for shippers and 44:56 for carriers.

While neither change is big, they speak volumes about a period in which digital technology has come to the fore in many sectors. It's clear that supply chains need more, not less, human expertise than they did.

The research also confirmed that, while shippers have been adopting more digital technology, not all aspects of supply chain operations can be automated effectively, as there are still areas where people excel. When asked which tasks were best performed by humans alone, the shippers in the study cited communicating with customers and logistics partners, followed by resolving delivery problems and obtaining quotes. When carriers were asked the same question, their three "top people tasks" were resolving delivery problems, load scheduling and communicating with brokers and logistics partners.

Overall, the report confirms that logistics and supply chain leaders want the best in both technology and human skills. If supply chains are to succeed, the right balance must be achieved between the two.

The main problem caused by an over-reliance on technology is that, when something does go wrong, skilled people are required to solve the problem. As Ronald Binkofski, president of Honeywell's operations in central and eastern Europe, notes: "Manual labour can have its advantages over a complete reliance on technology. For example, if a machine breaks down, a whole system could go down with it, resulting in a bigger disruption."

Full automation doesn't equal success and, more often than not, a successful supply chain operation combines people and technology to the best effect. Although technology has brought huge benefits to supply chains, particularly in managing disruptive events, it is the people who use it that play the key role.

"Technology provides essential data visibility, but it is the highly skilled professional, who understands that information and makes changes, that's so valuable for building resilience," says Philip Roe, chief customer officer and strategy director for the UK and Ireland at DHL Supply Chain. "Data is nothing if it cannot be understood and applied by people."

In an interview with management consultancy Oliver Wyman in October 2020, Lynn Wu, associate professor of operations, information and decisions at the University of Pennsylvania, noted that technologies such as machine learning cannot always distinguish causal links from mere correlations.

For instance, Google's now-defunct Flu Trends service was good at predicting outbreaks to start with, but over time its search results included words such as 'basketball', which had nothing to do with influenza, apart from the fact that the NBA season began at about the same time of the year that flu outbreaks tended to start in the US.

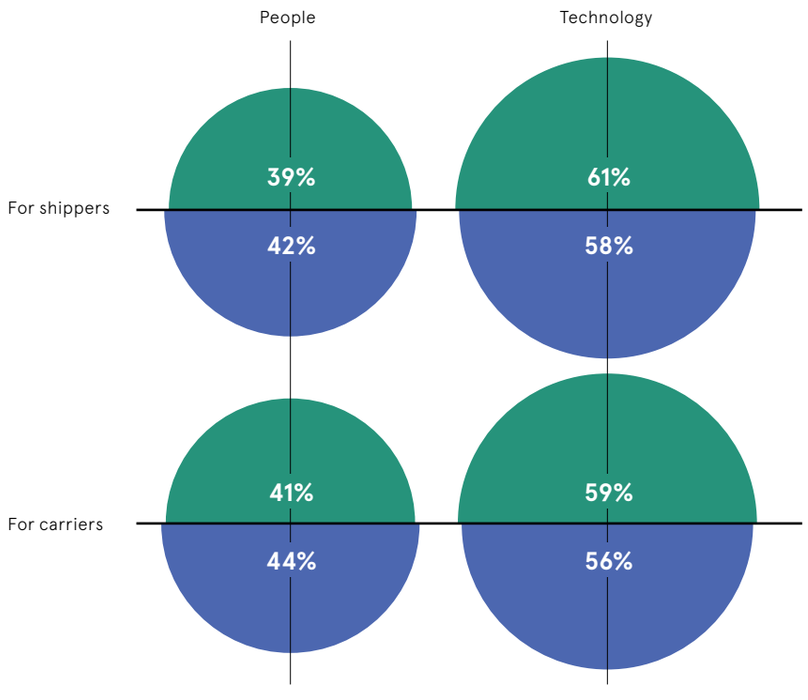
"You see lots of that in decision-making as well – something seems plausible, but it's a spurious correlation," Wu said. "In a state of uncertainty, you need to be sure that A is really causing B, not just that A is correlated with B. Human judgement will always be involved when you use data to make important decisions."

Technology has become vital in helping supply chain managers to meet a seemingly never-ending list of demands, according to Christine Barnhart, senior director of product and market strategy at Infor.

"Software or applications are really built to support employees, making it easier for them to access data, glean insights, make decisions and observe outcomes," she says. "Decision-makers don't have time to mine their own data or perform detailed analyses, but they need their employees to have this access and ensure trust in the results and the insights or recommendations provided."

PERCEPTIONS OF THE IDEAL BALANCE BETWEEN PEOPLE AND TECHNOLOGY IN SUPPLY CHAIN MANAGEMENT HAVE SHIFTED SINCE THE COVID CRISIS

Percentage weighted to technology and people



Coyote Logistics, 2020

> **Technology provides essential data visibility, but it's the highly skilled professional, who understands that information and makes changes, that's so valuable for building resilience**

It's therefore crucial that supply chains have the right tools. By cutting the amount of time required to perform tedious jobs, such as data entry or sifting large data sets, they free people to focus on more pressing and valuable tasks.

"The focus is not on replacing humans with machines but on taking on non-value-adding and/or cumbersome activities, so that people can devote more of their time to complex decision-making," Barnhart says.

Previously the industry's focus was on agility, efficiency and achieving maximum value at minimum cost. But today's volatile world has shown that adaptability and quick thinking are what drive successful supply chains. This new way of operating signals the need for supply chain leaders to adapt and demonstrate new skills.

"To make rapid changes to an organisation in order to manage disruption, collaboration and communication, it's essential to bring people along with you," Roe says. "You have to be able to plan in a collaborative manner with your partners, customers, authorities and maybe even competitors to achieve the outcome you want."

Likewise, in the increasingly data-rich world of supply chains, exception management and a deep understanding of data are key, he adds. As much as technology can do for us, it is not what's behind decision-making during periods of great disruption. A resilient supply chain requires human adaptability and foresight.

"Imagination is an incredibly powerful tool," Roe says. "It not only enables you to plan for disruptive events; it's also more likely to grant you the ability to work at speed and be adaptable."

Binkofski believes that, to create resilient supply chains, leaders need to "embrace the right technologies for their businesses' needs and ensure that these are seamlessly integrated across their operations alongside their employees. Such a holistic strategy will ensure that their businesses remain as resilient as possible."

TACTICS

Five ways to better manage supply chain disruption

These practical insights from experts in the field will help in case of future crises

Oliver Pickup

Don't focus on cost alone

The countless stock delays and shortages over the past 18 months – caused mainly by a lack of readiness for pandemic-induced disruption – have, for the first time in decades, called into question the running of lean supply chains designed to boost efficiency and profitability.

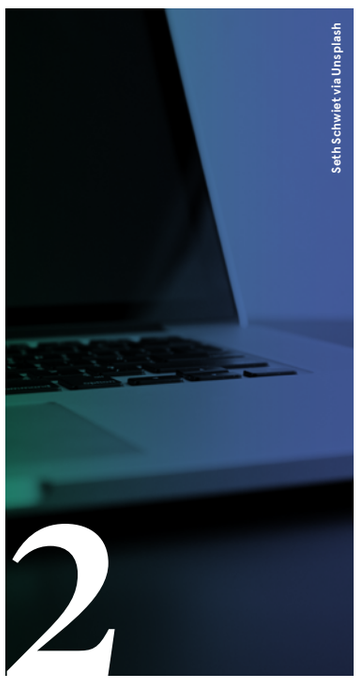
They have laid bare a complex and fragile system that "has ultimately morphed into an investment plan focused on quick fixes and last-minute saves", according to Patrick Van Hull, industry thought leader at Kinaxis, a global supply management company.

Malcolm Harrison, group CEO of the Chartered Institute of Procurement & Supply, agrees that many companies had seemingly dialled up their risk in the hunt for greater financial rewards.

"Ensuring resilience and achieving value have always been the overarching objectives for procurement and supply professionals," Harrison says. "Focusing on cost alone is a risky strategy for any organisation. For decades, we have had strong, lean and sometimes single-sourced supply chains working so efficiently that we have hardly noticed them."

The pandemic, he says, has encouraged supply chain managers to renew their focus on multi-supply strategies, local sourcing and best value in the supply chain, which may entail working with competitors.

Invest in technology



Dr Dirk Holbach, chief supply chain officer for laundry and home care at Henkel, says it has been a tremendous advantage to his company that its digital transformation was well under way before the pandemic struck.

He adds: "The real-time visibility along our supply chain, which is a result of deploying Industry 4.0 technologies, has allowed us to focus on the right challenges and make the best decisions."

Van Hull points out that companies which were investing in their digital transformation before the Covid crisis were already financially outperforming the industry average. They have surged further ahead of their rivals over the past 18 months.

"These types of results present a significant opportunity for supply chains, which have historically struggled with translating digital transformation and operational capabilities into financial success," he says.

Nurture supplier relationships

While investment in technology is vital in increasing supply chain resilience, old-fashioned human conversations to solve problems are just as important whenever disruptions strike. Developing a good relationship with a supplier will build mutual trust that can be cashed in when required, whether it buys favourable prices, shorter lead times or extra stock.

And, just as the adage suggests, a problem shared is a problem halved.

"Embrace collaborative supply chain risk management," advises Dr Alireza Shokri, associate professor in operations and supply chain management at Northumbria University. "Invest time in a collaborative culture, build trust and use these relationships to strengthen prevention and mitigation strategies."

Shelley Harris, commercial director of IPP, a provider of pallets and boxes across Europe, agrees. "Our partner relationships are key, helping us to face new challenges as well as to work as efficiently and productively as possible," she says.

The strength of its supplier relationships has enabled IPP to continue fulfilling all of its delivery obligations despite the problems the wider industry is facing, particularly driver shortages.

"We are stronger because of our long-standing relationships," Harris says. "As a result, we have seen a minimal impact on our operations."

Improve transparency

The most effective approach to managing disruption is to develop a deep knowledge of your supply chain and be transparent with information, according to Harrison.

While doing this requires the right technology, as businesses have had to operate more efficiently in the digital space with more automation, the process starts with understanding all the various tiers of the supply chain.

"Achieving transparency across all these tiers is a challenge," he acknowledges. "But such visibility contributes value, in that it [helps to] remove fraud and other corrupt practices. It also [helps businesses] to look for signs of modern slavery among their suppliers."

Harrison stresses the importance of determining how robust both your suppliers and their suppliers are. Transparency helps a business to identify risks – for example, if a component is being sourced from a single location – and to track shipments.

Van Hull concurs. "Increased transparency is highly desirable. It enables supply chains to sense disruptions and respond quickly," he says. "It is even more useful when it's tied to financial outcomes, such as reduced inventory and cash buffers, improved capacity utilisation and the lower-cost resolution of demand-supply mismatches."

Get the training right

Training is vital in maximising the potential of technology, according to Holbach, who adds that empowering local teams and using their expert knowledge will strengthen the supply chain. They will highlight potential problems early, giving the network a better idea of where to seek help with routing or stock if that's needed.

"We've had to react with agility during the pandemic. That's been possible only because we trust our teams worldwide," he says. "It has created the freedom to act fast, find the best solutions and keep our customers supplied with essential products."

Holbach believes that a progressive approach to training starts from the top of an organisation. "Leaders should never stop learning," he says. "To prepare for the unknown, you need to have the right mindset when confronted with new and difficult situations."

Harrison echoes this point, saying that supply chain professionals need to equip themselves with the right skills and commercial judgement. This can be achieved only through training, which means keeping up to date with their continuing professional development.

"This pandemic has shown that you need to invest in both technology and people to ensure supply chain resilience," he says. "Then we will manage better through the next global shock."

Data at the heart of supply chain resilience

The pandemic exposed worrying fragilities in global supply chains, creating an urgent need to embrace a more intelligent approach which eliminates data silos and increases visibility

The severe circumstances of the Covid-19 pandemic forced organisations to reflect on the processes that are yet to reach digital maturity, holding supply chains back. The sudden shift in consumer demand, coupled with lockdown-related production outages, created a highly visible supply crisis documented by images of empty shelves in shops. Less visible impacts were felt even harder by businesses.

Despite their best efforts to adapt as best as they could, the lack of visibility and flexibility within supply chains was already so deeply entrenched that delays were almost impossible to avoid. Fragmented IT infrastructures, over many years, have created data silos that prevent ready access to critical information when it matters. An inability to make informed decisions quickly, based on the most up-to-date information, hinders organisations from responding to sudden supply issues or changes in demand, leaving companies scrambling during times of disruption.

"There has been significant supply disruption in both the first mile and last mile of demand fulfilment," says Mark Holmes, senior advisor for supply chain at InterSystems, a leading provider of data technology. "Keeping manufacturing up and running has been incredibly challenging, as well as rebalancing inventory to meet customer demand through dramatic changes in buyer behaviour. The shelves have often been either bare or not the typical products we like to see.

"All of this has highlighted the inadequacies of a linear non-digital supply chain, as well as inefficiencies in predicting and managing the impact of constraints in the supply chain. These inadequacies were always there but have been exposed by the pandemic. Companies need actionable insights in a more collaborative and digital supply chain. The only way to get out of firefighting mode is to really accelerate digital transformation and improve supply chain visibility."

> **Putting data at the heart of supply chain resilience allows a company to orchestrate disruption and constraints of supply and demand within the supply chain to meet fulfilment in a predictive manner with a high degree of accuracy**

In a recent InterSystems survey of retail, consumer packaged goods and manufacturing organisations, 83% of respondents said the pandemic worsened their technology-specific supply chain challenges. The most prevalent problem is the lack of flexibility in existing processes, cited by 43% of supply chain professionals, but many are also experiencing other data-related issues, including a lack of access to current data and accurate end-to-end visibility, and difficulties performing analytics and integrating and normalising disparate data.

All of these challenges existed long before the Covid-19 crisis and will continue to cause problems when the pandemic finally ends, if organisations don't improve their data management and overall supply chain visibility. Commercial off-the-shelf software and siloed supply chain applications are not sufficient. An additional data management layer is needed to enable organisations to overcome the issues they are facing, removing silos with a single, accurate and current view of data that helps them gain better visibility internally and across their supply chain.

"The data problem is spread all over," says Holmes. "There is no single source of truth, and it's not a new problem. Previous approaches to data management and integration have been challenged with the complexity of moving data in batch mode, and manually using that data. Disparate data systems are holding back the entire supply chain ecosystem, which the end customer relies on to get the products they want. Putting data at the heart of supply chain resilience allows a company to orchestrate disruption and constraints of supply and demand within the supply chain to meet fulfilment in a predictive manner with a high degree of accuracy.

"It's exactly the problem that InterSystems has been solving for decades. We connect disparate data sources and enhance visibility. It's in our DNA. We identify critical business initiatives, including understanding the impact of variations in demand and supply, optimising replenishment centres and inventory rebalancing. Our architecture is built around a smart data fabric, an exciting new approach which allows us to connect to core systems and an ecosystem of supply chain partner systems, to access data on demand while also reducing complexity and accuracy and improving the customer experience."

Processes such as demand forecasting and inventory optimisation can be further enhanced with the use of the latest artificial intelligence (AI) and machine learning (ML) technologies. Acquiring large numbers of skilled data scientists is an unlikely option for most organisations, least of all when such talent is so difficult and expensive to recruit. Businesses must therefore consider how they can capitalise on the benefits of AI and ML without the requirement for costly expert knowledge.

New innovations, such as InterSystems IntegratedML™, allow organisations to easily add advanced analytics to applications without the need for such in-house expertise. The technology simplifies the process of building, testing and deploying ML models, and automates the process of integrating them seamlessly into production applications. InterSystems IntegratedML™ helps businesses to develop accurate ML algorithms directly within existing data management infrastructure, without requiring a team of skilled data scientists, while embedding the models into supply chain applications to take programmatic actions in response to real time events.

"Intelligent data solutions, and technologies like AI and ML, will power supply chains in the new normal. I cannot tell you how many discussions with our clients that I have where the VP of supply chain is now responsible for manufacturing. Why? Because of the link between intelligence supply chains and smart manufacturing. It is all about decision support to help business users. Our technology analyst referred to this as 'augmented transactions', which means embedding AI and ML into business software and workflows.

"With an interconnected supply chain, companies can be predictive and prescriptive around workflows to drive automated action, such as replenishing requirements from different inventory locations to meet peak period demand. Auto ML is a new technology we're putting into those workflows. There are a lot of challenges around skill shortages in the area of data science and analytics, so building AI and ML into our supply chain workflows is more important than ever."

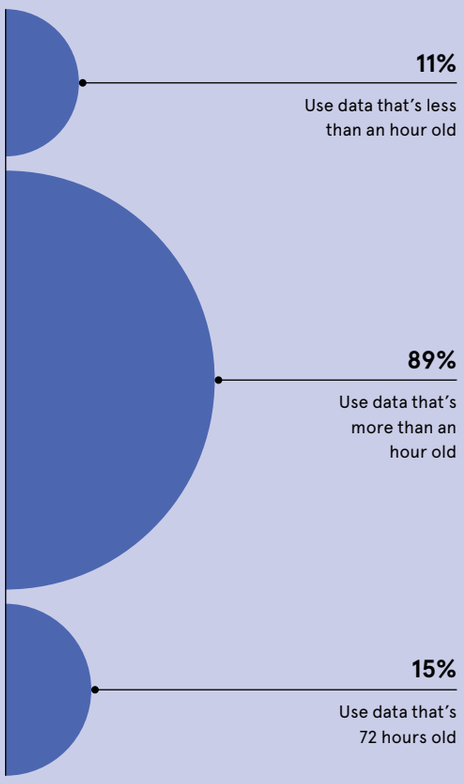
For more information, visit intersystems.com/supplychain

InterSystems®
Creative data technology

HOW COVID-19 HIGHLIGHTED SHORTCOMINGS IN THE SUPPLY CHAIN

The Covid-19 pandemic caused a major shift in consumer behaviour which left retail, consumer packaged goods and manufacturing organisations globally challenged to respond rapidly to meet sudden changes

ACCESS TO DATA DELAYS



11% Use data that's less than an hour old

89% Use data that's more than an hour old

15% Use data that's 72 hours old

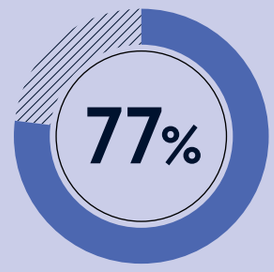
THE BIGGEST CHALLENGES

44% experienced a lack of flexibility in existing processes

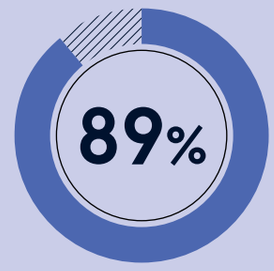
40% lacked accurate end-to-end visibility and reporting

40% had difficulty performing analytics to support the business

LOOKING TO A SOLUTION



are looking to increase the adoption of AI/ML technologies in the next year to improve processes



believe they require data management software in their end-to-end supply chain

InterSystems

Luca Prestia via Getty Images

DIVERSITY

Chain reaction: why supplier diversity matters

The global movement for racial and social justice has called on businesses to play their part. What better place to start than with their procurement practices?

Maria Highland

Just like several other commercial functions, procurement is being affected by changing consumer demands. Public pressure on businesses to adopt more ethical supply management practices, which had been growing steadily over the preceding years, has intensified significantly since the eruption of the Black Lives Matter protests in 2020.

As a result, many companies are seeking to improve the diversity of their supply chains, shifting their focus away from cost control and towards value creation. For instance, Coca-Cola has pledged to spend $1bn (£730m) annually with "diverse suppliers". Part of this commitment includes "doubling our spending with Black-owned enterprises across our US supply chain – by at least $500m cumulatively – over the next five years".

Similarly, UPS has committed to doubling its expenditure with Black-owned suppliers by the end of this year, while Siemens has awarded $140,000 in grants to Black-owned enterprises in seven US cities to help them "develop their businesses so they can compete for our contracts and become part of our supplier base".

Behind such pledges is the desire to improve the resilience of supply chains, create more commercial opportunities and achieve environmental, social and corporate governance (ESG) objectives. Improving diversity in the supply chain also helps to drive organisation-wide change and demonstrate to the world what these companies stand for.

"Procurement teams play a critical role in creating equity across supply chains and in achieving companies' ESG goals," says Mandi McReynolds, senior director of ESG at software company Workiva. "Supplier diversity improves an organisation's market growth and its image among employees, customers and investors."

UPS started its supplier diversity programme back in 1992, notes its vice-president of international sustainability, Peter Harris. He adds that the company has more than doubled its expenditure with diverse businesses in just under four years. This has been driven by UPS's commitment to working with suppliers that reflect the make-up of the firm's employees and customers.

"Diverse suppliers contribute to the economic development of communities and provide expertise and innovation that helps us to serve our customers and outperform the competition," Harris says.

The company's chief officer for procurement, real estate and global business services, Jose Turkienicz, agrees. "We know that working to ensure that diverse companies, including small businesses, have opportunities to bid for UPS contracts makes us stronger. Their solutions provide tremendous value to our customers and shareholders," he says.

McReynolds believes that companies with truly diversified supplier bases can benefit communities that are underrepresented economically by offering them commercial opportunities that will create income and employment. "Supplier diversity also has a positive impact beyond those directly related to the organisation by progressing global diversity and sustainability objectives," she says.

> **Supplier diversity improves an organisation's market growth and its image among employees, customers and investors**

By opening up the request-for-proposal process to firms that would typically fall outside the normal field for consideration, procurement teams can stimulate greater competition among suppliers, according to McReynolds, who adds: "This can lead to better pricing; access to a larger pool of products and services; and improvements in product quality and service delivery."

Since 2014, L'Oréal has partnered AAK, a Swedish provider of vegetable oils, and fair-trade company Olvéa Burkina Faso to source shea butter from the impoverished west African country. L'Oréal says that the partnership is designed to provide a fair income, with no middlemen, directly to the country's shea-nut gatherers and processors, nearly all of whom are women; to train them in best production practice; and to protect the environment by preserving shea trees.

The company, which imports all of its shea butter from Burkina Faso, has empowered about 42,000 female workers in the country since starting the programme, according to Gemma Bell, procurement director at L'Oréal UK and Ireland.

"We are well aware of the significant impact that our purchasing decisions can have on suppliers and local communities," she says. "We run a well-established 'solidarity sourcing' programme that directs a proportion of the group's global purchases to suppliers that give people from disadvantaged backgrounds access to work and a sustainable income."

When a business is developing a programme to improve supplier diversity, a common challenge for the procurement director is to secure sufficient backing from the top of the organisation and ensure that other key functions are strategically aligned with the initiative. A fully engaged senior leadership team should allocate enough finance to support smaller, diverse suppliers, while adequately resourcing the team that will implement the programme, McReynolds says.

"It's also important to set clear objectives and report on these transparently, using diversity and inclusion metrics to build trust among employees, investors and other stakeholders," she adds.

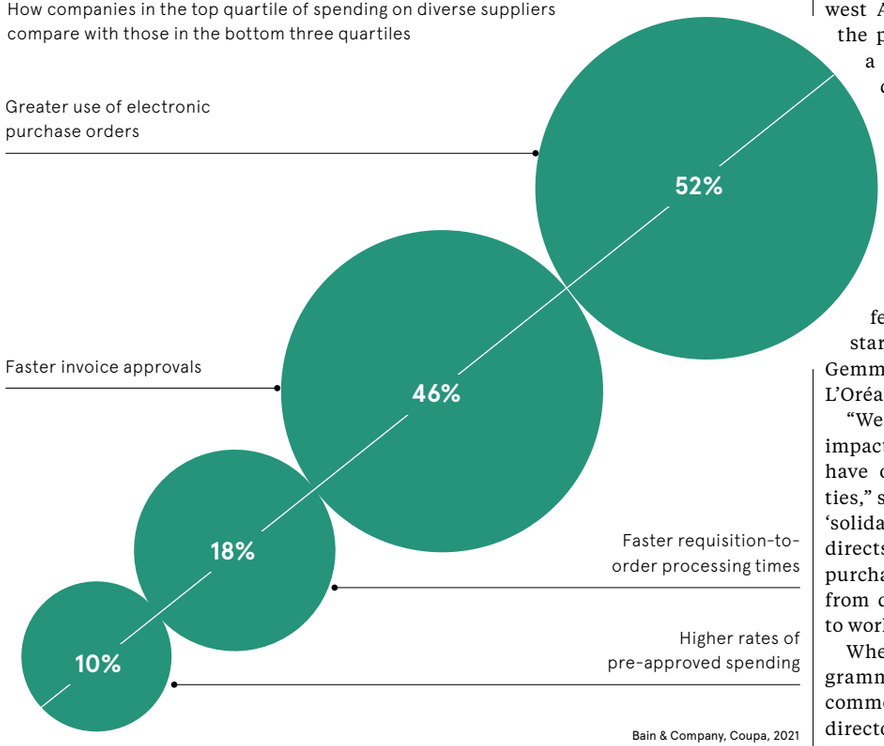
Toyota promotes supplier diversity by requiring its tier-one suppliers to achieve specific annual expenditure targets with certified diverse suppliers upstream of them. The car manufacturer says that it also offers a wide range of resources that have been designed to "provide diverse-owned businesses with the professional growth opportunities, expert guidance and capacity-development resources they need for economic viability". These include technical and managerial assistance, mentoring programmes and scholarships.

Another common challenge is to create equitable procurement requirements to ensure that the smallest firms can compete on a level playing field with the established players, according to McReynolds.

Large suppliers have several advantages granted by their scale. They can invest heavily in marketing and lead generation, for instance, and are more able to bear the costs associated with international travel, she says. Procurement teams therefore need to understand the relative disadvantages that smaller suppliers may face in such respects – and also how vital it is for them to be paid promptly.

DIVERSIFYING SUPPLY CHAINS IS IMPROVING PROCUREMENT PROCESSES

How companies in the top quartile of spending on diverse suppliers compare with those in the bottom three quartiles



Bain & Company, Coupa, 2021

© 2020 Hybrid Air Vehicles

CLIMATE CHANGE

On the road to net-zero logistics

The decarbonisation of supply chains is as critical to the UK's net-zero ambitions as it is difficult to achieve, but innovations are emerging to address the problem areas of air freight, shipping and road haulage

Jim McClelland

A combination of extreme weather and the upcoming COP26 conference is making net-zero headline news. Carbon footprints are under scrutiny and the problem is emissions. For supply chains, that means logistics.

Contributing more to the problem than any other sector, transport produced 27% of the UK's total greenhouse gas (GHG) emissions in 2019, according to the Department for Business, Energy and Industrial Strategy. HGVs and vans were collectively responsible for more than a third (35%) of this. Factor in kerosene-rich air freight, plus emissions in the wake of cargo shipping, and logistics is firmly in the frame for climate crimes.

As a result, the UK regulatory net is tightening. With a ban on sales of new diesel lorries due by 2040, the sustainability squeeze is on. Logistics must decarbonise – and fast.

Going green on electric avenue

In road transport, the green agenda is having a positive impact at regional and local level. M&H Carriers, for example, has recently invested £500,000 in 10 new e-vans to electrify its Highland delivery fleet – a first for the north of Scotland. Such stories of rolling electrification are appearing almost daily.

Of course, the electric avenue is not the only route to carbon reduction. Hermes UK has ordered another 70 delivery trucks fuelled by compressed natural gas (CNG), taking the firm's total CNG fleet up to 160 and making it the largest in the parcels sector. Each new Iveco S-way model can cut CO_2 emissions by more than 80% compared with a diesel vehicle that complies with the current Euro 6 emissions standards, which were set in 2015.

Rather than making a radical modal shift – from road to rail, say – a simple fuel change often makes short-term greening affordable, according to Andrew Willson, CEO of fuel supplier Coryton.

"Switching to sustainable fuels is a drop-in solution, requiring no significant investment in infrastructure or vehicle architecture and capable of delivering near net-zero operating CO_2 emissions," he says.

Willson adds the caveat that life-cycle analysis always beats a tailpipe focus. His note of caution is timely, given that new research from Cornell and Stanford universities has revealed blue hydrogen to be more carbon-intensive than using diesel, natural gas or even coal directly for heat.

> **Hybrid aircraft technology offers an alternative that sits between fast, carbon-intensive air freight and slow, less carbon-intensive surface transport**

Hydrogen economy set to make waves

Heat aside, though, hydrogen is still a hot prospect. According to BloombergNEF's *New Energy Outlook 2021* report, the number of shipments of electrolysers to split water for clean hydrogen are set to double in 2021 and quadruple in 2022, with China the dominant player.

The UK government's 10-point plan for a green industrial revolution, published last November, included a preliminary target of 5GW of low-carbon hydrogen production capacity by 2030, with those ambitions expanded upon by the new hydrogen strategy, published this August.

But mainstream adoption remains some way off, explains Dr Benjamin Sovacool, professor of energy policy at the University of Sussex Business School and co-author of a new research paper exploring applications of hydrogen in industry. The use of hydrogen for short-haul trucking could be feasible within six to eight years, he posits, although its use as an alternative fuel in shipping is likely to take longer: potentially up to 15 years.

According to his findings, delivery times might be cut in half if hydrogen were prioritised by policy-makers and industry leaders. And, while hydrogen for shipping may take longer, its impact could be greater:

hydrogen, and fuels derived from it, could ultimately satisfy more than 70% of the sector's energy demands.

A co-director of the new £20m Industrial Decarbonisation Research and Innovation Centre, funded by the NGO UK Research and Innovation, Sovacool believes that ammonia will be key for shipping.

"Maritime transport is likely to benefit from renewable hydrogen-derived ammonia as its primary decarbonising fuel option in the medium term," he predicts. "Falling electricity prices from renewable and nuclear energy will lower production costs of green ammonia, bringing it in line with fossil-derived hydrocarbon fuels."

Ship emissions in the dock

Shipping emitted more than 1 billion tonnes of CO_2 in 2018, representing 2.9% of total global human emissions for the year, according to a GHG research report published by the International Maritime Organisation (IMO) in 2020.

In response, the IMO's initial GHG strategy envisages a reduction in the carbon intensity of international shipping by at least 40% compared with 2008 by 2030, striving towards 70% by 2050.

Many environmental impacts of shipping actually occur when vessels are in dock, rather than at sea. With this in mind, the Port of Hamburg has introduced green berthing areas in the River Elbe, with solar-powered mooring systems manufactured by Straatman.

When it comes to rethinking ship design, the True Zero Emission concept from UK firm Windship Technology promises more disruptive innovation. Its triple-wing rigs harness the power of the wind, with the look of a 21st-century clean-tech clipper.

Cooperate to cut carbon and save money

Beyond the transport methods it uses, logistics is also overhauling operational processes and systems, particularly in light of the environmental impacts of ecommerce growth during the Covid lockdowns.

Engaging customers can also help to reduce carbon footprints, says Dr Vaggelis Giannikas, associate professor with the School of Management at the University of Bath: "Retailers and providers should be examining technologies that allow for greener logistics, while at the same time developing mechanisms to motivate sustainable consumer behaviour."

According to Giannikas, who is also director of the Centre for Smart Warehousing and Logistics Systems at Bath, some companies have already found innovative ways to decarbonise, including incentives to consolidate orders into fewer deliveries, preventing the unnecessary use of fast and ultra-fast options. As well as packaging that limits empty space, they are prioritising a reduction in returns, even offering items for free. Direct communication with customers – for instance, via text to arrange for an attended delivery – helps optimisation too.

Collaboration between parties in retail and logistics can also open doors. The UK click-and-collect agreement between the Post Office and leading logistics carrier DPD serves as a case in point.

In addition, opportunities are arising for synergistic innovation in partnership with other major growth markets for electrification, such as buildings and real estate. Power management company Eaton has developed an approach, called Buildings as a Grid, that unites the power needs of both property assets and electrical vehicles to optimise charging, using on-site renewable energy sources and storage facilities.

> **Switching to sustainable fuels is a drop-in solution, requiring no significant investment in infrastructure or vehicle architecture and capable of delivering near net-zero operating CO_2 emissions**

Working with French mail delivery group La Poste, Eaton tested the approach on electric delivery vans in Paris. In a year-long trial, it found that solar power could supply 59% of the electricity required by two electric vehicles.

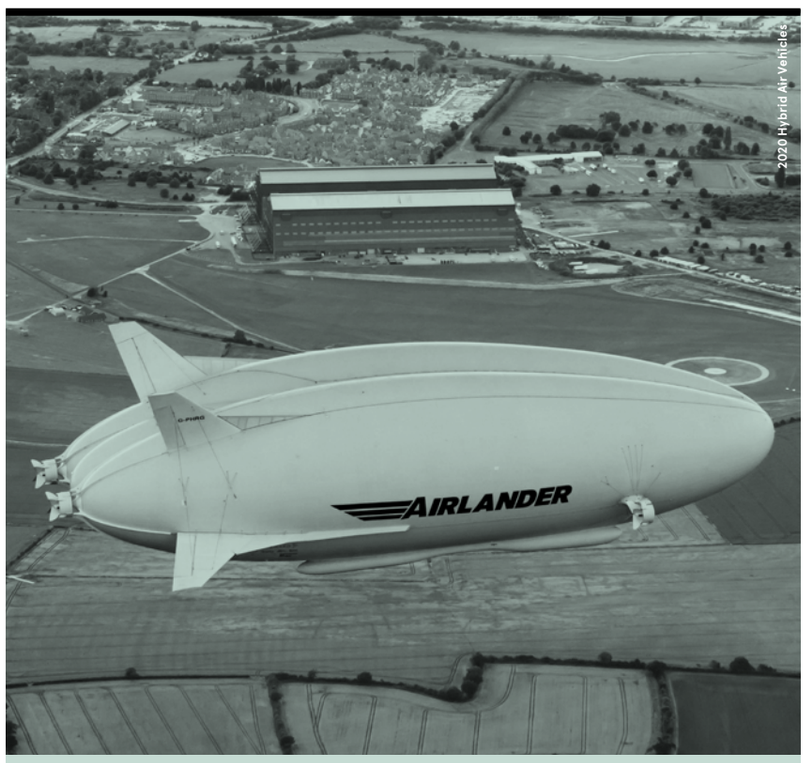
Digital efficiencies enabled by AI

Like many industries seeking to improve their environmental performance, logistics is necessarily embracing digital technology. Coupled with AI, it can help to eliminate mistakes and offer complete visibility of a product throughout its journey. Firms can not only speed cargo from A to B; they can also assess traditional routes and modes of transpart to improve efficiency.

Working smart in this way offers a potential win-win in the short term, suggests Sam Tyagi, founder, chairman and CEO of customs clearance platform KlearNow.

"This relatively simple process of sharpening operations across import and export markets will have a significant impact on reducing carbon emissions, while solutions are found for more complicated challenges such as air freight," he predicts.

Given the sheer scale of the decarbonisation task ahead, the reality is that the industry will need all these initiatives and innovations – and more – on the road to net-zero logistics.



2020 Hybrid Air Vehicles

Drones, electric planes, hybrids and airships

Air freight is the conveyance of choice for higher-value products such as perishables requiring fast delivery. Although it accounts for under 1% of world trade shipments by volume, the air freight industry was valued at well over £70bn last year.

According to the UK government's *Jet Zero* consultation paper, the sector's projected environmental impact is a concern. While aviation contributes between 2% and 3% of global greenhouse gas emissions today, it is forecast to become the second-highest residual emitter in 2050. Innovation is therefore a must.

Supporting big advances in small packages, a three-month drone trial funded by a £200,000 grant from Aerospace Cornwall will see a Flylogix unmanned aerial vehicle making daily flights between Land's End and the Isles of Scilly. These machines consume only 2l of fuel per hour, compared with between 20l and 200l for traditional aircraft making the same journey. The drone will carry time-critical items such as medicines and blood samples.

At the other end of the scale, DHL Express has claimed a world first for sustainable aviation with its order of 12 fully electric Alice e-cargo aircraft from Eviation. Able to carry payloads of 1,200kg, these single-pilot planes are due for delivery in 2024.

On a bigger scale still are airships. We may be more used to seeing them in the TV series *His Dark Materials* than in real life, but they offer a significant opportunity to cut CO_2 emissions.

One such vehicle is a hybrid aircraft called the Airlander, manufactured by UK-based Hybrid Air Vehicles (HAV). About 60% of the aircraft's lift is generated by the buoyancy of helium (it would be 100% in a traditional airship). The remaining 40% is created aerodynamically by the flow of air over its wing-shaped hull.

Sustainability is a strong selling point for airships and hybrids, explains Tom Grundy, CEO of HAV. Aircraft using lighter-than-air technology are fundamentally more efficient, he says. By using the so-called free lift provided by buoyant gas, they require significantly less power, which means fewer emissions.

"In logistics, therefore, hybrid aircraft technology offers an alternative that sits between fast, carbon-intensive air freight and slow, less carbon-intensive surface transport," Grundy says.

HAV plans to have aircraft in service from 2025. With a payload of 50 tonnes, a fully electric (and amphibious) Airlander 50 could be available by 2033. Its CO_2 emissions are expected to be 1.15kg per tonne of freight per km less than that of a conventional aircraft.

It seems, then, that lighter-than-air technology may soon be doing much more of the heavy lifting in logistics.

Siemens Mobility

Trucking down the e-highway

When it comes to the battery capacity of electric vehicles, HGVs have long been held up as the acid test, given their heavyweight power demands and long range requirements. But innovations in this sector are emerging worldwide now, from manufacturers such as Scania and Volvo, while the Tesla's Semi truck is due out soon.

The business case for e-lorries has also been boosted by recent research from the University of California, Berkeley, and UCLA, which has found that medium- and long-haul electric trucks in the US are 13% cheaper to own than diesel alternatives and could be almost 50% cheaper by 2030. So, while the total number of trucks on the road remains small, we might be reaching a technology tipping point, suggests Sandra Roling, head of transport at environmental services company the Climate Group.

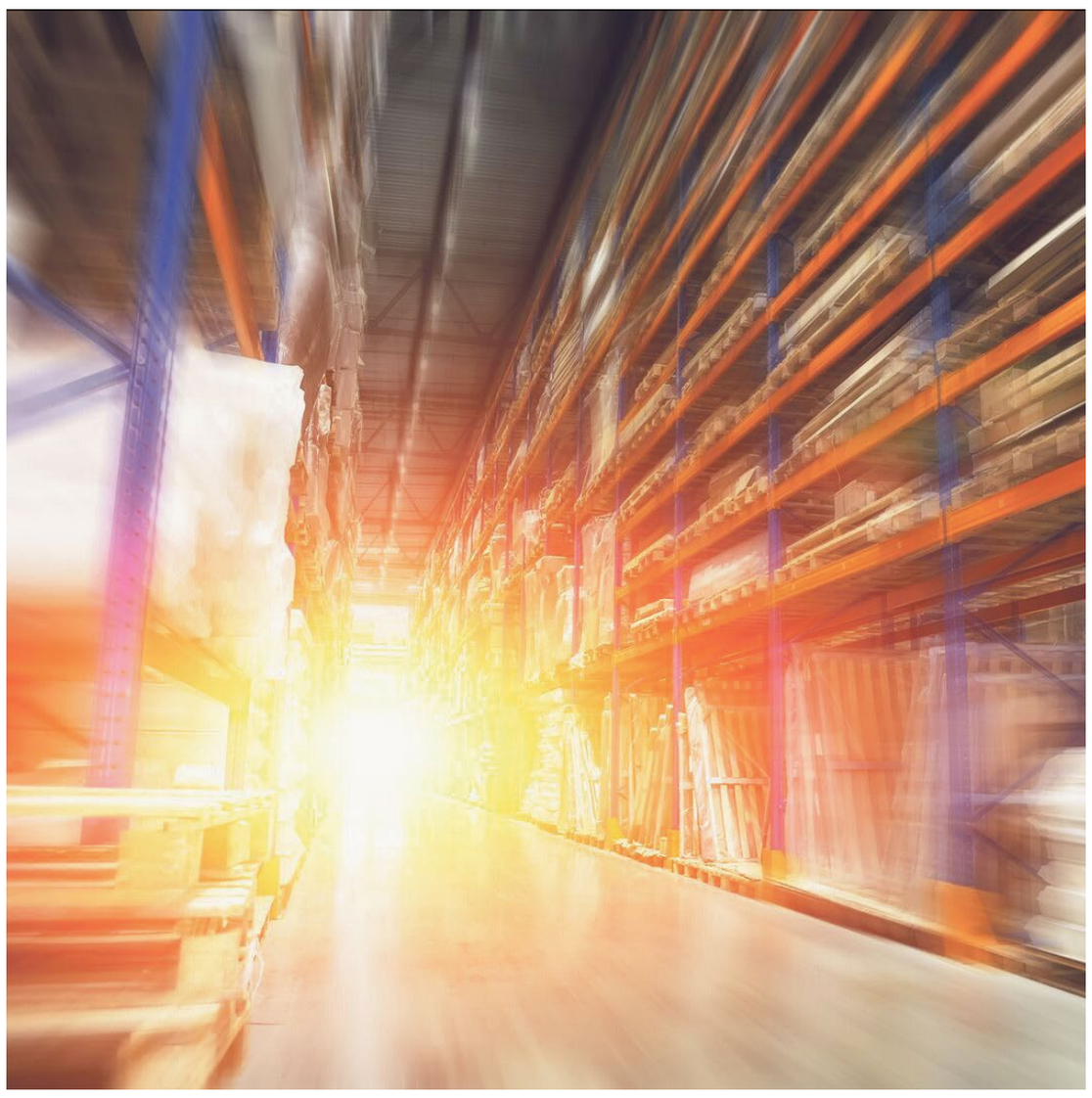
"Falling battery costs; technology transfer from other vehicle sectors (notably, electric buses); growing interest and investment from manufacturers; and supportive policy have all accelerated development of medium- and heavy-duty zero-emission trucks," she says. "There's a growing range on the market in practically all weight and use classes."

Indeed, the Climate Group's EV100 initiative has more than 100 large multinational businesses committed to switching more than 5 million vehicles to electricity by 2030. And collective initiatives are also under way to find solutions to the problems of range anxiety and charging infrastructure.

In Germany, a consortium including the Berlin Institute of Technology, Bosch and the Fraunhofer Institute for Transportation and Infrastructure Systems is working on a three-year project called eHaul, designed to determine whether large swappable batteries for HGVs offer a sensible alternative for daily trips of more than 180 miles.

In the UK, the government has committed £2m to a plan for overhead cables to be installed on a 12-mile stretch of the M180 near Scunthorpe. This electric highway project is being led by Costain, with trucks from Scania and electrical equipment from Siemens – both of which have already worked on trials in Germany and Sweden.

Electric highways can accelerate progress towards net zero, as William Wilson, CEO of Siemens Mobility, explains: "Merely introducing electric vehicles alone won't help us hit our decarbonisation targets. As a country, we need to go faster and harder if we're to meet our 2050 goals. E-highways are a tried and tested way of making it possible for clean and efficient electric HGVs to run on motorways. They also answer the burning question of not having enough charging infrastructure."



Weathering the storm: how retailers shifted to ship-from-store in record time

Manhattan Associates cloud-native supply chain software helped major US retailers turn closed stores into mini fulfilment centres during lockdown

When the US went into lockdown during the Covid pandemic, PVH Corp, which owns iconic brands like Tommy Hilfiger and Calvin Klein, realised much of its stock was trapped inside shuttered stores. At the same time, ecommerce demand for its casualwear lines began to surge as shoppers sought comfy clothes to wear while working from home. This left PVH scrambling to fill a rush of new online orders while also being unable to sell anything in-store – an unprecedented situation.

"If you were a traditional high street retailer with a high street presence and between 15-30% of your business online, the forced closure of your store network was not something you were ready for," says Craig Summers, managing director for UK and Ireland at Manhattan Associates, which designs, builds and delivers supply chain software that unifies front-end sales and the back-end supply chain. "And in the case of most businesses, you could never have been ready for it because traditional infrastructures don't allow you to be."

Although few would have predicted nationwide store closures at the start of 2020, PVH's longstanding partnership with Manhattan Associates meant it was quickly able to address the rapid growth in online orders and scale its fulfilment capabilities.

PVH pivoted quickly to configure business rules in Manhattan Distributed Order Management that exposed store inventory to online consumers, routing orders to optimal fulfilment locations, and turned closed stores into mini fulfilment centres for ecommerce orders. In-store staff were also trained on how to pick and pack these orders.

"The basic principle we try to work on with our customers is if you've got it, you should be able to sell it," says Summers. "So really it shouldn't matter where it sits within the supply chain."

PVH also set up separate ecommerce fulfilment areas at two of its warehouses to bolster the efforts of its external fulfilment provider, with workers used to handling pallets shifting to picking individual items. Thanks to Manhattan Associates' order management software, PVH was able to limit the volume of online orders flowing to the warehouses while staff got up to speed. And all of this was achieved in a matter of weeks.

The changes PVH needed to implement have given the company a better handle on where demand is and where consumers are shopping, and allowed it to be far more nimble in its approach to inventory. In fact, ship-from-store has proved so successful that it has now become part of PVH's long-term strategy.

Pivoting at speed

PVH is just one of the countless companies that had to find new ways to deliver to customers after a surge in ecommerce sales and the closure of stores. Stay-at-home orders and social distancing measures closed all of US fashion accessories brand Kendra Scott's stores, for example, and its main distribution centre in Austin, Texas was limited to minimum basic operations. Though some inventory was rerouted to a 3PL in another state, capacity was severely hampered.

Manhattan Associates was already a partner to Kendra Scott, helping the company keep up with growth through the Manhattan Order Management System. As the crisis deepened, the retailer reached out to the Manhattan team and got to work implementing Manhattan Store Order Fulfilment. After just six working days, Kendra Scott was able to start leveraging stores to fulfil ecommerce orders.

> **Resilience is being ready for the next unknown. You need to know that whatever system you've got today can flex quickly for what might come next**

Pivoting at this kind of speed would have been impossible with a legacy system. "Even with all of the right intent and theory in place, the execution would have been really hard with an old school architecture," says Summers. After the success of its ship-from-store efforts, Manhattan also helped Kendra Scott introduce curbside pickup capabilities.

Although businesses have talked about the need for this kind of supply chain agility and resilience for many years, before the pandemic most had only made incremental progress. Today, many have now seen first-hand that cloud-native solutions can provide a level of flexibility, agility and support that simply isn't achievable otherwise. Take visibility: without it, you can't make truly informed decisions during a crisis.

"If a retailer has a lot of stock in Aberdeen, it may not always be worth them making it available for sale in Southampton," says Summers. "But that's a decision you can make on an informed basis because you have the visibility and the information you need."

Versionless visibility

Good, reliable data that spans all of your systems and is stored in one place is the foundation of this kind of visibility, and that's only really achievable with a cloud-native solution. Why? Well, for one thing, the timescales involved in planning and putting in place a large on-premise system mean that "by the time they go live and have been in use for a couple of years, you could be seven years or more behind current thinking," says Summers.

In other words, if your software isn't cloud-native and versionless like Manhattan Associates, "you're always going to be playing catch-up." That may not be a serious problem in some business areas, he adds, "but the types of systems needed to keep the supply chain running means there is a never-ending requirement to be up-to-date."

To be truly up-to-date and resilient, businesses also need to structure their operations around inbound and outbound flows rather than siloed warehouse and transport functions. Because in retail, there's also a never-ending requirement to scale up and scale down your activities.

"Retailers have always had busy periods, peaks throughout the year, whether January sales or Black Friday," says Summers. "All of their infrastructure has to be ready for the hour of that maximum demand. And yet the rest of the time, it isn't really utilised. The elasticity of the cloud means when you need that capacity, it's there. It allows you to meet demands as they come along."

The right software can also help companies to protect their employees during a crisis. "People have to come first," says Summers, emphasising that, without them, supply chains simply don't work. "In a distribution centre, you want to make sure that the warehouse management system knows how to keep people apart safely. Because if social distancing measures are in place, you may need to quickly layout your distribution centre in a different way or change work schedules so that people aren't concentrated in one place."

Despite the challenges of the pandemic, Manhattan Associates delivered 591 customer projects in 2020 across the world, with the majority delivered remotely. Ultimately, says Summers, "resilience is being ready for the next unknown. You need to know that whatever system you've got today can flex quickly for what might come next." And as PVH, Kendra Scott and other retailers have found, that's exactly what Manhattan Associates helps its partners to achieve.

For more information please visit manh.co.uk

Manhattan Associates

FINANCE

Why Greensill is a red flag for the industry

Greensill Capital, the ill-fated provider of supply chain finance, claimed to be offering vital support for hard-pressed small firms, but is SCF all that good for SMEs?

Ouida Taaffe

The provision of working capital against receivables is one of the world's most enduringly popular financial services. As a workaday form of commercial funding, with private, tailored arrangements and low default rates, supply chain finance (SCF) has tended to operate well below the radar – until the collapse of Greensill Capital made it front-page news.

The failure this year of the Anglo-Australian SCF provider, which had counted former prime minister David Cameron as one of its advisers, has raised questions about whether this form of finance is truly beneficial to everyone involved.

In its widest sense, SCF is a range of solutions that provide working capital to aid the cash flows of companies that are both buying and selling. So says Lionel Taylor, co-founder and managing director of the Trade Advisory Network, a provider of SCF consultancy and training services.

And it's big business. The International Chamber of Commerce (ICC) reports that SCF is responsible for most market growth in trade finance. Nearly two-thirds (64%) of global banks offer such services. But the ICC also notes that this market is beset by a lack of common understanding about what it deems "appropriate practice" in SCF. There is no definitive guidance on accounting treatments and reporting requirements either, which can motivate "boundary-pushing practices or even outright abuses".

Greensill advanced funds against what it called "future receivables", but it imploded because those receivables did not exist.

The Greensill affair puts the spotlight on how small players in the supply chain are treated by their bigger customers. Any business will typically need to finance its purchases and other overheads before it has been paid by its customers. That is not a problem for larger companies with investment-grade liquidity lines from big banks, but a stuttering cash flow can hit SMEs hard. They may find it difficult to borrow to cover their outgoings while they await payment, or have access only to high-cost credit.

"This cash flow gap can become more challenging as these businesses grow. It's not uncommon for a banker to hear that a company that had purported to be doing well has overtraded and run out of cash," Taylor says.

SMEs inevitably get the rough end of the deal, as slow payments are an ingrained problem, observes the national chair of the Federation of Small Businesses (FSB), Mike Cherry.

"Our members long for a world where SCF doesn't exist," he says. "Rather than forcing firms to borrow against invoices or sell them on for a cut of their value, we should focus on achieving a culture change, with the aim of finally putting our poor-payment crisis to bed."

With this in mind, the FSB is working with the Small Business Commissioner, a public body established by the Department for Business, Energy and Industrial Strategy in 2017, to have 30 days set as the new maximum payment period in the UK.

Are big companies deliberately wringing out their suppliers? Taylor says that they would rather pay later whenever possible to preserve their working capital. But the existence of SCF does not necessarily mean that their suppliers will suffer as a result.

"As an example, a small firm could get its cash after five days at a rate that reflects the credit rating of a large investment-grade company rather than its own," he says.

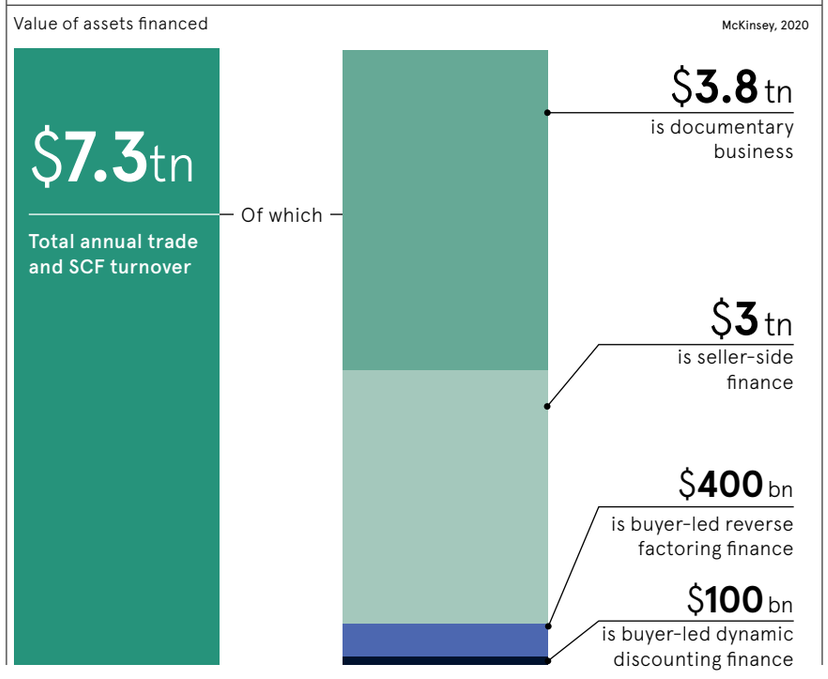
To make this possible, banks will set up a payables finance programme for large buyers. Each programme requires much analysis of different areas of the buyer's organisation, all of which are keen to ensure that any programme does not harm the relationships the buyer has with its suppliers, says Taylor, who adds: "It takes months to set up the right arrangement."

One reason why the process is complex is that there are few rules governing it. The ICC wants to see a co-ordinated effort to decide on the right approach. This, it says, should involve stakeholders such as credit rating agencies, accounting firms and institutes, regulators, trade bodies, finance providers and companies of all sizes.

Even with a set of clear rules to follow, SCF wouldn't become a simple process. For instance, banks are required to ensure that funds aren't used for activities such as money-laundering, but this becomes more difficult if they're dealing with SMEs on the other side of the world.

And small firms can be happy to join an SCF programme even if they find some aspects of it uncomfortable. For one thing, it makes them an integral part of the buyer's production process – something that a big company with a just-in-time supply chain will work hard to protect. Fundamentally, it will try to pay its suppliers on time even when liquidity is tight.

THE COMPOSITION OF TRADE AND SUPPLY CHAIN FINANCE



> **A lesson learnt from Greensill is that it's incumbent on funders to do their homework and understand what they are financing**

The supportive relationship that an effective SCF programme offers small firms should also enhance initiatives to improve sustainability. The FSB wants corporate audit committees to be granted complete oversight of their companies' payment practices. This is partly so that boards adopting an environmental, social and governance agenda would have a way to ensure accountability when it comes to nurturing the supply chain.

Greater accountability is required to focus minds. But getting sustainability right depends on having all the right data to hand. As Taylor says: "One lesson from Greensill is that it's incumbent on funders to do their homework and understand what they are financing."

That has always been a long, costly process. But, as the internet of things enables the real-time collection of supply-chain data, SCF providers should find it far easier to track performance in many areas.

This could support the nurturing relationships the FSB wants to see. The German Banking Industry Committee, for instance, recently noted that tokenised commercial bank money could allow the application of automated 'smart contracts'. These could trigger an immediate payment when, say, a shipment has been sent. On-the-ground data could also take liquidity right up the supply chain to the smallest firms that SCF currently doesn't reach.

What is clear is that SCF is unlikely to go away. Smaller companies will always face the threat of liquidity gaps. Done right, SCF can benefit everyone in a supply chain and also support sustainability. The latest technological advances promise to make all this possible.

Commercial feature

Why the cloud is essential for supply chain resilience

Cloud-enabled companies have been more flexible and agile during the Covid crisis, but successful migration of on-premise systems requires a trusted partner

The Covid-19 pandemic disrupted global supply chains with stunning swiftness. But some businesses were able to withstand this once-in-a-lifetime event better than others – and many of them shared some common characteristics.

Firstly, they were flexible. Secondly, they were agile. And thirdly, they had great partners working with them. But without the cloud, none of this would have been possible.

When it came to quickly pivoting operations to hybrid work, new suppliers, online orders or contactless delivery, for example, "cloud applications proved faster to get started, supported more innovations, and kept businesses running," says Kerrie Jordan, director of product management for cloud solutions at Epicor, which provides market-leading cloud-based ERP systems.

In the early days of the pandemic, some businesses had to navigate both the closure of in-store sales channels and surging ecommerce demand. But thanks to the flexibility and scalability of cloud solutions, many were able to manage this sudden, rapid growth in online sales without major disruption.

However, the benefits of cloud solutions are game-changing no matter what the economic landscape looks like. "Instead of spending the resources to find safe and adequate space for servers, or the qualified personnel to maintain and secure them, you can spend those resources on the business – evaluating, investing in, and adapting the right-fit technology and talent to take your competitiveness to the next level," says Jordan.

While moving to the cloud is increasingly essential, many companies are still cautious about change though. Which is why a trusted partner is so important during any migration journey.

"An expert partner is critical to a successful migration to the cloud because they bring an industry perspective and long-term vision," says Jordan. "They will have learned best practices from all the other companies, probably several like yours, who have tackled and solved many of the same challenges you face."

Most importantly, businesses should seek an expert partner who will be there for the long haul. "Getting to the cloud is certainly an important step, but the best partners are those who stay ahead of technology trends, understand your industry, and keep innovating, so you can rely on them for years to come," Jordan explains.

As such, it's perhaps not surprising that 47% of the 1,250 technology decision-makers Epicor surveyed for its Industry Insights report said a dedicated migration partner is essential. But despite the obvious benefits of the cloud, fears around integrations and data protection, as well as concerns around talent, are still stopping some businesses from taking the leap.

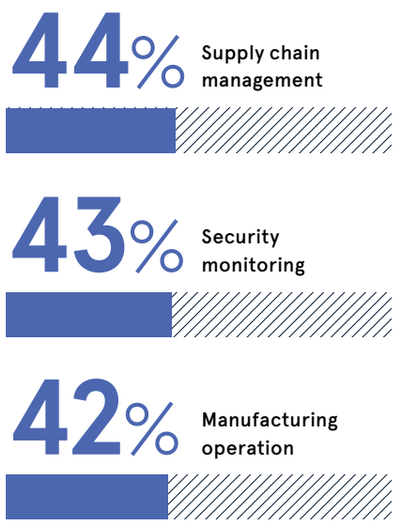
"Many companies don't know where to find accurate information or even where to start," says Jordan, who advises companies to "prioritise your team first. Make sure you have the right people, empower them, and reward progress. Help them define success post-migration so there is a clear understanding of value."

Those that get this right can unlock new competitive advantages – something borne out by Epicor's report, which found that 92% of all cloud businesses feel they are leaders or on par with the competition, while those mostly on-premises feel left behind. What's more, 36% of businesses on cloud expect to recover by the end of 2021, compared to only 28% of mostly or all on-premises ones.

All this means it's now undeniable that the cloud is an essential component for supply chain future-proofing. "There is no other feasible technology model to ensure long-term business success, especially given the sheer scale of global business, the amount of information to be processed and secured, and the infinite possible supply chain disruptions to solve," says Jordan. "Business leaders today need a platform that embraces innovation and turns data into insight, so they can confidently lead their organisations into the future."

CLOUD APPEALS TO TECHNOLOGY DECISION MAKERS WHO FEEL CLOUD CAN VALUE ACROSS MULTIPLE BUSINESS UNITS

Areas that businesses are most interested in migrating to the cloud



Epicor, 2021

For more information please visit epicor.com

EPICOR

REAL ESTATE

Space race: how big sheds have become hot property

There is a serious shortage of high-quality warehousing in the UK. What has caused this problem – and how quickly can it be solved?

Rich McEachran

The Covid-induced growth spurt in UK online sales over the past 18 months has forced etailers to expand their operations to such an extent that they spent a record £6bn on building new warehouses in the first six months of this year, compared with £2.7bn in H1 2020, according to Knight Frank.

The estate agency forecasts that the amount of warehouse space being created in developments exceeding 4,500m² around the country in 2021 will be double last year's total of 1.9 million m². Yet no matter how quickly these big sheds are being built, the demand for storage facilities still far exceeds the supply.

"The availability of high-quality space in particular has diminished owing to robust levels of occupier take-up over the past 18 months," reports Charles Binks, partner at Knight Frank and head of the firm's logistics and industrial agency. "Our data shows that only 3.9 million m² is available – and much of that space is either under offer already or not of the right spec for potential occupiers."

The industry finds itself in this situation because of two main factors: Covid and Brexit. At the start of the pandemic, fears of shortages prompted many consumers to stockpile household essentials. When supermarkets introduced rules to prevent hoarding, this put their home-delivery capacity under huge pressure.

Although the vaccination programme has since enabled high-street retailers to reopen, a significant proportion of consumers who started doing their shopping online at the start of the crisis are sticking with the relative ease and safety that ecommerce has offered. This has led to intense competition among ecommerce specialists (and clicks-and-mortar retailers) for prime warehousing facilities.

Research from Savills indicates that Amazon leased a quarter of all available warehouse space in the UK in 2020. In August this year, the John Lewis Partnership signed an 11-year deal to lease a 93,000m² distribution centre in Milton Keynes from Tesco. This will support John Lewis's move from physical retail towards ecommerce – during the height of the pandemic, the online channel's share of the partnership's total sales jumped from 40% to 60%.

On top of this, the reintroduction of customs controls at the border between the UK and the EU resulting from Brexit has inevitably caused delays to imports and exports. This disruption to the supply chain has increased demand among retailers for extra storage space as a precautionary measure.

Binks notes that a shortage of adequate facilities in the right locations is encouraging speculative development, in which warehouses are being constructed even before any companies have been lined up to occupy them.

Without a significant increase in the amount of industrial land coming forward to the market, the supply of high-quality logistics space will continue to be constrained

"There is 840,000m² of space currently under construction on this basis," he reports. "But, even accounting for these projects, there is still a particularly acute lack of availability in the big-box market, where occupiers seeking units of 33,000m² or larger have very limited options."

To make matters worse, shortages of materials and/or labour are delaying some warehouse construction projects, all of which serves to push up costs.

The general increase in the value of property in most parts of the country has also been having an inflationary effect. Philip Woolner, joint managing partner at Cambridge-based estate agency Cheffins, reports that annual rents for new industrial units in desirable locations around the East of England are between £110 and £140 per m², while those for warehouses in the very best locations can be even higher. Only five years ago, the top industrial rents ranged from £75 to £90 per m².

"The combination of strong demand, very short supply and increased building costs have contributed to a rental growth rate that shows no signs of abating. Without a significant increase in the amount of industrial land coming forward to the market, the supply of high-quality logistics space will continue to be constrained," says Woolner, who adds that the problem is being exacerbated by planning restrictions, such as the time it typically takes to secure permission to build an industrial unit.

So how can the industry get enough space in the right place at pace?

"Perhaps one way the UK could surmount this challenge would be to allocate significant acreage to industrial development in some of the larger state-led schemes," Woolner says.

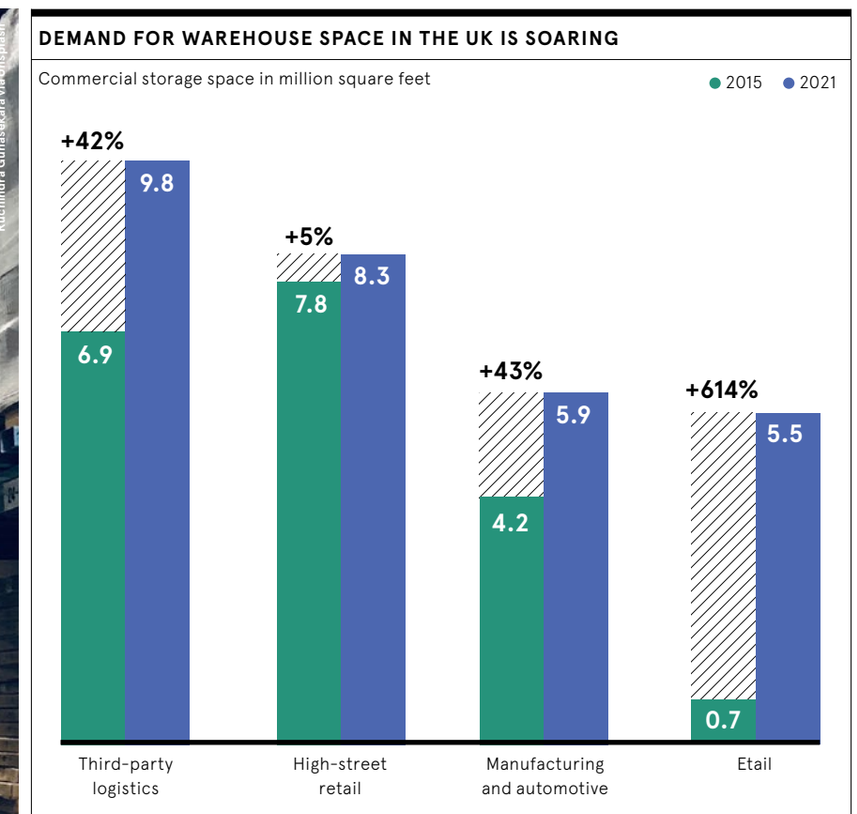
He notes that the government is forming a long-term strategic plan to help co-ordinate the infrastructure, environment and new developments in an area that it calls the Oxford-Cambridge Arc, a tract spanning five counties and centring on Milton Keynes. To this end, it started a public consultation this summer.

For its part, Cheffins is seeking interested parties for a 24,000m² development of mixed-use commercial space (including storage) in Cambridgeshire. It's hoped that the inclusion of space for research and development facilities in this scheme should attract potential occupiers interested in updating their warehousing and fulfilment processes.

Woolner says: "While logistics might not be the most exciting part of the commercial sector, it does need to be factored into these government-led programmes if we're to feed the demand."

The intensifying competition for prime space will encourage innovation in logistics, according to Mike Trainer, real-estate partner at law firm Gowling WLG. He believes that etailers with the proprietary technology that can host the branded websites of other companies – and the capacity to handle fulfilment and delivery themselves – will undoubtedly have a competitive edge.

"Innovation lies at the heart of the technology-led online market", Trainer says, "and logistics is essential in making this all work." ●



OPINION

'Change is inevitable, but it feels like the speed at which supply chains are transforming has gone up a gear or two'

Businesses have gone through a crash course in managing risk and disruption over the past 18 months, with the fragility of many supply chains around the world exposed. With shipping charges increasing to eye-watering levels and shortages on supermarket shelves appearing, we have a great deal of work to do to bring more stability post-Covid and post-Brexit. Here are the key elements that I believe will help businesses to manage this volatility in the coming months.

First, companies need to build resilience in supply chains. To do this, simplification is key. Simplified supply chains are naturally more transparent and mean businesses can gain a better handle on what's going on in terms of inefficiencies, delays or disruptions.

Next is an understanding of true value. Finding cost savings is a fundamental skill of trained procurement professionals, but I would urge the industry to think beyond this. Cost savings will mean nothing if business operations are halted because savings came before quality or on-time delivery. And value metrics for procurement should also include successes such as eradicating modern slavery in the supply chain; eliminating bribery and corruption; and achieving diversity and sustainability goals, which all add value beyond the needs of the company itself.

Sustainability is key to protecting business as well as the planet. Why? Because we are not only on the cusp of a climate crisis, but consumers and othre stakeholders also want companies to take it seriously. Some businesses, such as Mars and PepsiCo, are working with their competitors to meet their sustainability challenges, showing that companies do not have to go it alone if they can think creatively. By collaborating with others we can be so much more impactful, effective and efficient when addressing issues of importance to society. Carbon footprint measurements can be difficult to verify, so look at other targets too, such as reducing waste, emissions or energy consumption.

Businesses should also be thinking about the balance between nearshoring and farshoring sourcing strategies for their operations. Seat, the automotive company, is taking local sourcing very seriously. Last year, it added to its bank of Spanish suppliers - already at 60% of its total purchasing expenditure – to safeguard its business against future disruption. A product that doesn't turn up because it is sourced from a supplier that is too far away could be an expensive mistake.

Next, suppliers. Building strong relationships and open communication channels with suppliers will build trust and give more visibility of the supply chain. Support suppliers in any way possible and share data on demand forecasts. Above all, pay promptly as the first step in ensuring that they stay in business. Both General Motors and Ford implemented fast-payment programmes for small suppliers in 2020 to see them through the pandemic.

Using digital solutions in supply chains give businesses more, better and faster insights, and they can bring greater efficiencies in terms of cost management, inventory and operations. Our research found that 95% of organisations had adopted at least one digital technology over the past year and 30% have been using cloud computing systems in the past three years.

As well as using the data stored in the systems of your own business, searching for external sources of data relevant to the sector can give an early indication of disruption coming your way. Take the IHS Markit and CIPS Purchasing Managers' Indices each month. Snapshots of what's happening in a wide range of sectors, they offer important signs of potential shortages and of input price inflation around the world.

Change is inevitable, but it feels like the speed at which supply chains are transforming has gone up a gear or two. No one can predict every crisis on the horizon, but if we give skilled professionals the responsibility to build resilience in our supply chains and strengthen our business models, we should all come out stronger. ●

Malcolm Harrison
Group CEO, CIPS

RISK

Rethinking just-in-time

The global semiconductor shortage has highlighted the pitfalls of procuring parts right at the moment they're needed, but stockpiling isn't always the answer either

Rich McEachran

Nataliya Hora / Shutterstock.com

After car sales slumped at the start of the pandemic, demand for new models has accelerated this year to the extent that cars are sold before they even roll off the factory floor. While this is about demand outpacing supply, the crux of the problem is that a shortage of semiconductors is holding back production. This chip crunch is forcing the industry to rethink its supply management practices.

For a long time, car manufacturers have relied on just-in-time (JIT) supply chains, meaning that they access what they need only once it's needed. Toyota, which pioneered the JIT model in the 1960s, has described it as a concept in which each process produces only what is needed for the next process in a continuous flow. But, at a time when the chips have been down for nearly the whole automotive industry, it is Toyota that has best steered clear of disruption and kept its production rate on target. It ha achieved this not through JIT but by taking a just-in-case (JIC) approach – where inventory is stocked up before it's needed – to semiconductors.

Back in 2011, the Fukushima earthquake had affected hundreds of Toyota's suppliers.

> **JIT supply chains rely on the assumption that it's a universally negative outcome for components in a supply chain to come to rest at any point**

In light of that disaster, the Japanese car maker decided to overhaul its supply chain and implement a risk management system. It identified semiconductors as the components most likely to face delays in shipping, so it worked with its manufacturing partners to build a stockpile.

The ploy paid off. Toyota outsold General Motors in the three months to the end of June, becoming the biggest car maker by sales in the US in Q2 2021. It was the first time that this had happened since Q3 1998, according to analyst Edmunds.

The JIC strategy is about maintaining a minimum inventory level and hoping that stock never runs out. This can be costly if inventory is wasted, but the global nature of supply chains sometimes makes JIC a more suitable approach than JIT.

The goal of JIT is not to keep inventory low but to improve efficiency and reduce costs and warehousing requirements. Parts are delivered to assembly lines moments before they need to be fitted, which enables cars to be built to order. This works well if parts are manufactured in-house or from local suppliers that can guarantee delivery on a daily basis. In the case of semiconductors, most of the world's supply comes from a single firm, the Taiwan Semiconductor Manufacturing Company. Relying on parts to be shipped from one supplier is where JIT falls down.

Jennifer Bisceglie is the founder and CEO of Interos, a supplier of technology designed to manage supply chain risk. She says that JIT supply chains "rely on the assumption that it's a universally negative outcome for components in a supply chain to come to rest at any point".

The manufacture of a single semiconductor – a process that takes months – often involves hundreds of steps. The chip may have to cross international borders dozens of times before it reaches the customer. Many units will also be assembled, tested and packaged in the same location, increasing the likelihood of bottlenecks or shipment delays. This makes the supply chain fragile, leaving car makers exposed.

"This doesn't mean that auto makers can't try to approach [procuring chips] in a lean manner," Bisceglie says. "But it does give them an added incentive to develop real-time visibility of their entire supply chain, so that they can anticipate disruptions well in advance and stockpile exactly as much as they need."

Whereas JIT requires suppliers upstream to be able to provide parts on time every time, JIC will work only if customers are continuously predicting their demand for parts and instantly relaying that data to their suppliers. This ensures that suppliers are optimising production to meet demand and prevents companies from overstocking or understocking – in theory, that is.

"The only thing that can be guaranteed is that a forecast will be wrong," says Richard Sadler, director of business development at SMMT Industry Forum. "It's how these forecasts are managed that must improve."

This applies not only to semiconductors but to all critical components with long lead times, Sadler adds. The first step is to identify all these items, just like Toyota did after the Fukushima earthquake.

Bisceglie believes that car manufacturers have learnt lessons from the chip crunch and will already be reconsidering their JIT inventory approach to avoid getting caught out again. They will also be looking for ways to bring suppliers closer to production, so that they're more resilient in future.

"This current shortage is months, if not years, in the making," Bisceglie says. "Auto makers will be hard-pushed to acquire enough chips to meet current production goals, much less establish significant stockpiles in the near term."

Although the semiconductor shortage has highlighted the limitations of JIT and presented an argument for a JIC inventory strategy, the latter is not without it risks. For instance, warehouses where chips are stocked could easily be hit by fires that would destroy inventory.

Peter Maithel, an automotive supply chain strategist, says: "It's abundantly clear that auto makers can no longer afford to run as lean as they were doing before the chip crunch. But it will take time to find the right balance between JIT and JIC once things return to normal and demand patterns become clearer."

The industry won't turn its back on JIT completely, given how efficient the system can be, Maithel predicts. But car manufacturers will be seriously rethinking how they procure key components. ●

DISRUPTION IN THE SEMICONDUCTOR SUPPLY CHAIN IS AFFECTING CAR PRODUCTION

IHS Markit, 2021

Estimated lost output in the global light vehicle production market in 2021 (million units)