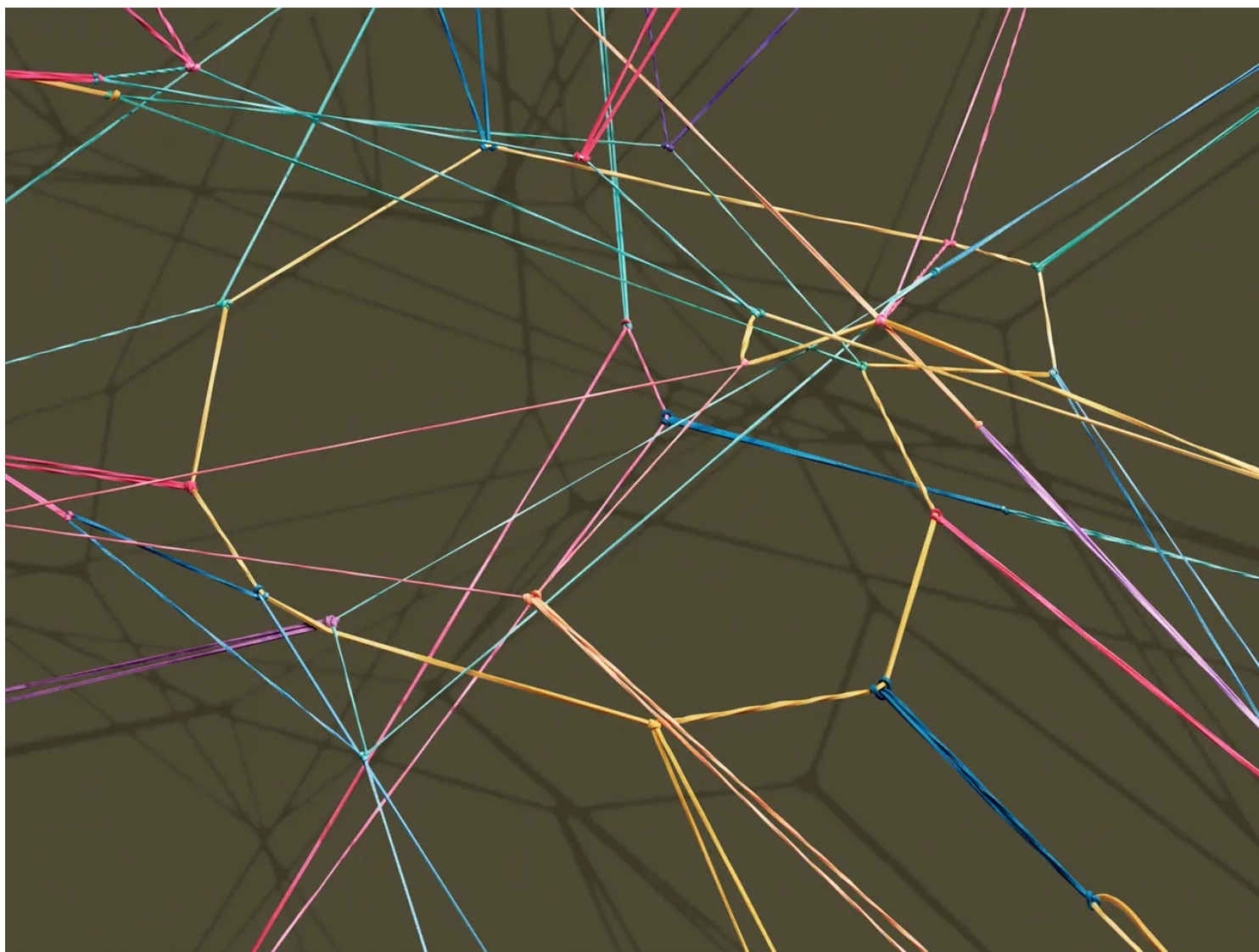


WILL KNIGHT BUSINESS MAR 28, 2022 7:00 AM

The Supply Chain Crisis Is About to Get a Lot Worse

A seemingly endless supply chain crunch has fueled interest in tech that promises to track problems or predict where new ones might occur.



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APPLICATION: LOGISTICS, PREDICTION SECTOR: MANUFACTURING

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THE SUPPLY CHAIN is in chaos—and it's getting worse. Air freight warehouses at Shanghai Pudong Airport are log-jammed as a result of strict Covid testing protocols imposed on China's biggest city following a local outbreak. At the city's port, Shanghai-Ningbo, more than 120 container vessels are stuck on hold. In Shenzhen, a major manufacturing hub in the country's south, trucking costs have shot up 300 percent due to a backlog of orders and a shortage of drivers following the introduction of similar Covid restrictions. Major ports the world over, which used to operate like clockwork, are now beset by delays, with container ships queuing for days in some of the worst congestion ever recorded. The list goes on.

More than a million containers due to travel to Europe from China by train—on a route that goes through Russia—must now make their journey by sea as sanctions bite. Russia's invasion of Ukraine has also severed key supply lines for nickel, aluminum, wheat, and sunflower oil, causing commodity prices to skyrocket. Countries in the Middle East and Africa that rely on produce from Ukraine are likely to experience serious food shortages in the coming weeks and months. Some European automotive production lines have cut their output due to a shortage of wiring normally sourced from factories in Ukraine. If the pandemic, which triggered a surge in purchasing of goods, caused the global supply chain to buckle, Russia's invasion of Ukraine and China's continuing zero-Covid policy risk breaking it completely.

The supply chain is too complex, interconnected, and fragile to be made completely immune to shocks, especially ones as seismic as a global pandemic or a major war. But a new reality is forcing companies to adopt new strategies to keep goods moving. In this reality, backlogs and breakdowns are the new normal, which makes getting ahead of disruptions as early as possible more important than ever.

“We used to occasionally have black swan events,” says Richard Wilding, professor of supply chain strategy at Cranfield University in the UK, referring to rare and hard-to-predict occurrences that have major impacts. “The problem at the moment is we

have a whole flock of black swans coming at us.” Wilding says managing a supply chain used to involve 80 percent dealing with predictability and 20 percent coping with surprises, numbers that have now flipped. And he says a growing number of companies are now using tools that provide greater visibility into the flow of goods, and which can sometimes predict potential choke points. “You effectively need to have continual monitoring,” he says. In an age when everything is connected, the global supply chain—a mess of transportation routes connecting commodities to manufacturers to buyers—has until recently remained alarmingly analog. That was manageable in the before-times, but the age of constant supply chain disruption is sending companies scrambling for more data.

Everstream Analytics is one company that gathers supply chain data by tapping into open source information, including shipping records, news reports, and social media, as well as data provided by customers that include logistics, shipping, and retail firms. Customers include DHL, Dupont, and BMW. Julie Gerdeman, the company’s CEO, says it employs analysts who try to predict trouble spots, but it also feeds the data it gathers into machine-learning models that are trained to find issues. Everstream predicts, for example, that last week’s shutdown in Shenzhen will have ripple effects in terms of manufacturing backlogs, shipping delays, and congestion that are as big as those caused by the Suez Canal blockage in March 2021.

Various types of data can help build a picture of gridlock as it unfolds. For example, Windward specializes in maritime information sources, including shipping transmissions, satellite imagery, and port and container data to analyze supply chain trends and risks. Chris Rogers, principle supply chain economist at Flexport, a company that helps businesses move goods and provides live tracking data on their movements, says it isn’t enough to simply know where products are. “There’s a thriving industry building those kinds of predictive analytics,” he says.

Rogers says Flexport’s data suggest that demand for goods, which shot up shortly after the pandemic began, buoyed by government stimuluses and the boredom of lockdowns, is also a key factor in the current gridlock. Rising interest rates and inflation could dampen spending, which has remained high ever since, and start to change the picture, he says.

The war in Ukraine, meanwhile, is already delaying or cutting off supplies of materials and products needed by companies that make cables, seat covers, and other automotive parts in nearby countries, including Moldova and Belarus. [A November 2021 study](#) published by the consulting firm McKinsey found that 93 percent of companies surveyed have plans to make their supply of materials and products more resilient and agile, with many looking to diversify by “on-shoring” or “multi-shoring” production. In simple terms, this means using several supplies distributed geographically and across the supply chain to spread the risk of disruption. But the same report found that just 2 percent of these firms were aware of the risks faced by companies further up the supply chain. An automaker, for example, might understand the risks facing the companies that supply it with components, but be unaware of the challenges facing the companies that manufacture the electronic chips used in those products. That’s a problem when new issues are likely to pop up in the weeks and months ahead, as more contagious strains of Covid test China’s zero-tolerance policy and the crisis in Ukraine continues.

[Willy Shih](#), a professor at Harvard Business School, who researches manufacturing and supply chains, expects China to be hit by further shutdowns and restrictions that strain production and shipping lines as new outbreaks flare up across the country. “I think it’s just the tip of the iceberg,” Shih says in reference to the recent lockdown of Shenzhen. “It’s going to depend on where new infections pop up, but it’s clear that it is in a lot of places now. And they do not have an exit strategy.”

In a notable shift, Chinese president Xi Jinping told a meeting of the Politburo last week that China must “minimize the impact of the epidemic on economic and social development,” according to an [official transcript](#). This is already translating into a less all-or-nothing approach to containing the virus, with Shanghai, for example, so far avoiding a full lockdown in favor of localized restrictions. Shih says the key challenge in trying to manage supply chain risk by mining data is that there are inevitable blindspots. “There are so many different players in the chain,” he says. This complexity, he adds, makes it hard to gather and synthesize all the data needed to build a complete picture.

Many of the global economic ripple effects of Russia’s invasion of Ukraine won’t be felt for weeks or even months. Russia is, for instance, one of the world’s largest

exporters of fertilizer, accounting for about 14 percent of the global supply. Fertilizer prices, which were already trending upward, are now 40 percent higher than they were prior to the Ukraine invasion, and will likely rise further as the global supply chain struggles to adjust to yet more disruption—which in turn will place further pressure on food production across the world.

And some of those knock-on effects may seem far removed from their cause. Wilding at Cranfield University says the price of tomatoes may spike in the coming weeks because some agricultural producers have switched to producing grain, which requires less fertilizer. “This interconnectivity and these parallel interactions will start going across the network,” he says.




Companies may try to make their supply lines more resilient, but according to William Reinsch, an expert on foreign trade at the Center for Strategic and International Studies, a think tank in Washington, DC, ideas about disentangling supply chains entirely, by moving US manufacturing out of China, for instance, are fanciful. “The connections are too deep and too great. They aren’t going to vanish entirely,” he says. Part of the problem is that the supply chain was already being stretched by trade and geopolitical tensions. “It’s the perfect storm, between Covid, the war, trade turmoil, and the growing antagonism between the US and China on economic issues,” says Reinsch.

Amid such turmoil, companies that promise even greater visibility into their supply chains are unsurprisingly gaining some attention. On March 23, one such company, Kargo, announced \$25 million in funding, with Flexport as one of its investors. Kargo sells a “sensor tower” that uses cameras, lidar, and thermal imaging to monitor activity at warehouses and logistics centers. Other companies try to track the movement of goods using tiny sensors. Wiliot, for instance, makes low-cost radio frequency tags that can be attached to shipping crates or individual products, allowing scanners to automatically track their location as they move throughout a supply chain, from a manufacturing plant to a retail store. That granular data could help make sense of the chaos—and help fix it.

For now, though, Wiliot itself is having to adapt to the supply chain crunch. The company currently gets its chips from Taiwanese giant TSMC, but Stephen Statler, a senior vice president of marketing at Wiliot, says rising tensions between the US and

China mean that it's looking to diversity. "When everything is made everywhere, and a piece of the puzzle is suddenly not available for whatever reason, everything kind of grinds to a halt," Statler says. "It's like we're dancing on a Rube Goldberg machine."

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