

From Ghost Kitchens to Alphabots, Broken Supply Chains Are Primed for a Fix

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One of the things that the current crisis has made abundantly clear is just how fragile our supply chains can be. When the reality of a widespread quarantine became clear, essentials like toilet paper, hand sanitizer, milk, and flour vanished from grocery shelves in a matter of days. Even then, most people assumed that once the hoarding was over all would be well. After all, the global supply chains for the goods we rely on every day are sophisticated, automated, and, above all, reliable. Right?

Wrong.

According to a 2018 report from research firm Statista, online sales of physical goods totaled \$504.6B at the time and were projected to exceed \$735B by 2023.^[1] That was before the global shutdown that threw online sales into hyperdrive and stressed many global supply chains to the breaking point. Seemingly overnight, third-party grocery delivery services like Instacart and Shipt were slammed with so many orders that customers were forced to wait hours in online queues. At one point, customers complained of being “7,000th in line”! Amazon Prime faced similar challenges, eventually shutting down its Prime Fresh service to new customers until it could find a way to accommodate the surge in demand.

Ordering, of course, was just the beginning. Once orders were finally able to be placed, many items were out of stock, making what used to be a simple act of grocery shopping a headache-filled challenge for households everywhere. While some of the shortages have been remedied—and grocery delivery has, at least for the most part, caught up to demand—serious supply chain challenges remain. America’s pork supply chain is in danger because of virus-related labor shortages at production plants. To date, more than 38 factories have been forced to close, setting the stage for a potential 50% reduction in meat production.^[2] For logistical reasons, the crisis hit the pork industry first, but chicken and egg farmers, cattle ranches, and dairies are likely to experience similar issues in the coming weeks and months. Carolyn Dimitri, associate professor of nutrition and food studies at NYU, points to the primary problem: a human workforce. “Unfortunately, almost our entire food system depends upon vulnerable workers.” In other words, when humans get sick, supply chains get disrupted.

What’s the remedy? Robotics, automation, and AI—or RAAI. A quick look at how supply chains began to break down paints a clear picture of how RAAI can help fix broken supply chains around the world.

The first quarantines went into place in China in late January, immediately after the Chinese New Year. This meant that many workers were quarantined at home, far from the factories where they were employed. With no workforce in place, factories—the starting point of the supply chain—were forced to close. With no products to ship, cargo fleets stopped leaving Chinese ports en route to the US. Then, with ships not arriving in US ports, there was no way for US farmers to export goods to China. With perishable goods piling up with nowhere to go, massive quantities of food rotted.

With restaurants suddenly limited to takeout and delivery, even more strain was introduced to the food supply chain. In 2019, the National Restaurant Association projected restaurant sales in the US to hit a new high of \$863B. In 1955, 25 cents of every \$1 spent on food went to restaurants. By last year, that ratio had reached more than 50 cents for every \$1. With restaurant services severely

restricted, grocery retailers were slammed with new demand that shocked the supply chain once again. According to the most recent data for the retail and food services sector from the [Census Bureau](#), sales in the grocery sector jumped 26.9% in March as consumers stockpiled groceries. It was a scenario no one could have predicted, and supply chains simply couldn't adjust quickly enough.

The Tipping Point For Automation And Logistics

The situation has highlighted the urgent need to put systems in place that enable highly flexible supply chains that can quickly react to change—even in extreme circumstances. Technology innovators around the world have the answers. By automating our warehouses, accelerating picking and packing processes, and streamlining delivery services, robotics, automation, and AI solutions are at the ready to reduce our reliance on the human labour force when necessary and to ensure we have what we need, when we need it.

- ***Automated warehouse solutions***

The work of ROBO Global co-founder and strategic advisor Raffaello D'Andrea has already had a major impact on how our supply chains function. As a co-creator of the now-famous Kiva robots, the automated warehouse bots that famously helped Amazon rise to the number-one spot in eCommerce by accelerating the process of picking and packing orders at its massive warehouses. Today, D'Andrea's work with autonomous indoor drone systems at his firm Verity is improving automated warehousing even further by enabling warehouse employees to access and inspect inventory at the highest heights—while keeping their feet safely on the ground.

According to Logistics Management^[3], the square footage for US distribution centers has grown not only out, but up. To make room for as much inventory as possible in the smallest square footage, warehouses rose in height to an average of 32.7 feet by 2018. Verity's high-flying robots are designed to help increase the efficiency and accuracy of inventory management in today's tallest warehouses—and to help keep products moving through the supply chain.

- ***Warehouse picking and packing***

Having a reliable workforce to complete the picking and packing of products to get them ready to ship to consumers is essential for maintaining efficient distribution. Not only is picking and packing one of the most labor-intensive processes at distribution centers, but, until now, it has been one of the processes that required the dexterity of human hands. Reliable robot grabbers developed at the UC Berkeley lab of ROBO Global strategic advisor Ken Goldberg are changing that reality by delivering the ability to use robots to pick and pack even the most delicate objects. It's a game-changer for e-commerce leaders like Amazon and Walmart. Berkeley's two-armed robot can pick up objects 95% of the time, at about 300 successful pickups per hour. Goldberg expects adoption of these sophisticated warehouse bots will kick off a total reimagining of warehouse distribution. It's a level of automation that may play a vital role in maintaining the flow of goods through the supply chain at all times.

- ***Online grocers***

According to Digital Commerce 360, households ordering groceries online are up 145.3 percent, and 31 percent of US households have used an online grocery delivery or pickup service during the past month. Ocado, the UK's top online grocer (and a ROBO Global index member) has seen a similar jump in sales in its own territory, with sales up 40%. It's a jump the company was able to

manage with ease thanks to its state-of-the-art online retail technology—including highly sophisticated warehouse software and robots. Ocado is also selling its software and robots to other supermarket chains worldwide, including Kroger in the United States and Casino in France. Online grocery delivery may have proved a challenge for other grocery retailers in early 2020, but as Ocado’s solutions gain traction across the industry, the barriers to success are quickly being eliminated.

- ***Micro fulfillment***

Curbside pickup has become a necessity in the wake of the global lockdown. It’s been a challenge for many businesses to make the switch, but once again, technology holds the key to a solution. Micro fulfillment was picking up speed long before the current crisis stressed supply chains, with Walmart leading the way. In 2019, Walmart announced its Alphabot—an automated 20,000-square-foot warehouse designed to enable faster, more efficient curbside pickup. Alphabot’s robotic carts retrieve items from the warehouse and deliver them to employees at a picking station who pack each order and deliver bags and boxes to customers’ cars in the parking lot. Walmart is not alone. Amazon is working with robotic fulfillment vendor [Dematic](#) to enable similar functionality at its new standalone grocery stores, and Kroger is building out standalone facilities powered by Ocado. At this last and vital step in the supply chain, micro fulfillment offers a promising solution.

- ***Prepared food delivery***

Demand for the delivery of prepared foods reached a new high in 2019, largely thanks to millennials, who have a seemingly unquenchable thirst for convenience. Services like Grubhub, Doordash, and UberEats have been happy to rise to the challenge, offering fast, easy delivery for everything from fast-food chains to four-star restaurants. ‘Ghost kitchens’ are quickly emerging to streamline that process—and may even be the answer to helping restaurants struggling to survive in the wake of the pandemic to operate on much smaller budgets. Ghost kitchens are spaces that allow restaurants, from large chains to small, independent kitchens, to prepare food solely for delivery. It’s a concept that’s rising fast. Kitopi, Creating Culinary Communities (C3), and Kitchen United are just three ghost kitchen operators that are expanding aggressively in the US and abroad. As the global population has grown and globalization has continued to expand, efficient supply chains have become more critical than ever before. Now more than ever, our supply chains are primed for a fix—and robotics, automation, and AI are delivering.

[1] “Retail e-commerce sales in the United States from 2017-2024”, Statista, February 6, 2020

[2] “Coronavirus: Meat shortage leaves US farmers with 'mind-blowing' choice”, BBC News, May 7, 2020

[3] [2018 Warehouse / Distribution Center Survey: Labor crunch driving automation](#), Logistics Management, November 5, 2018