Auto Makers Retreat From 50 Years of 'Just in Time' Manufacturing

Pressured by pandemic, the hyperefficient supply-chain model pioneered by Toyota is under assault

By Sean McLain
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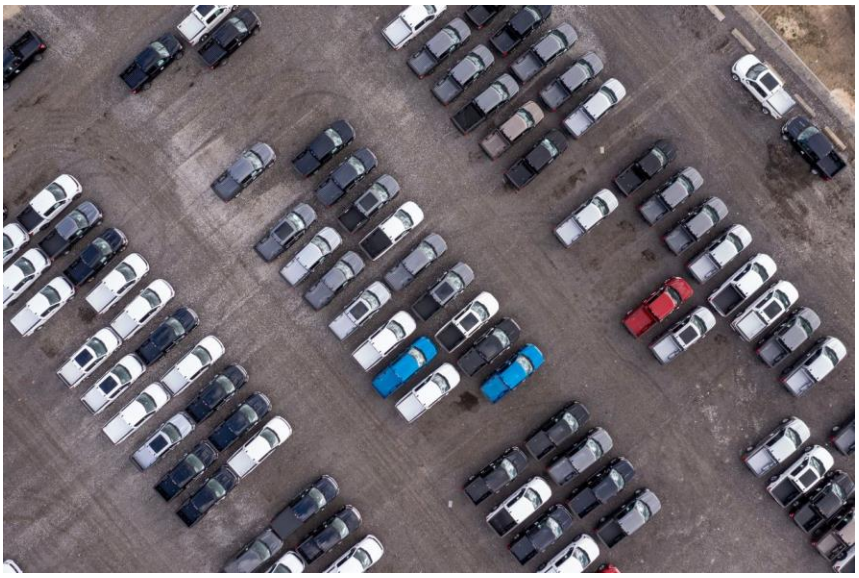
TOKYO—Toyota Motor Corp. is stockpiling up to four months of some parts. Volkswagen AG is building six factories so it can get its own batteries. And, in shades of Henry Ford, Tesla Inc. is trying to lock up access to raw materials.

The hyperefficient auto supply chain symbolized by the words "just in time" is undergoing its biggest transformation in more than half a century, accelerated by the troubles car makers have suffered during the pandemic. After sudden swings in demand, freak weather and a series of accidents, they are reassessing their basic assumption that they could always get the parts they needed when they needed them.

"The just-in-time model is designed for supply-chain efficiencies and economies of scale," said Ashwani Gupta, Nissan Motor Co.'s chief operating officer. "The repercussions of an unprecedented crisis like Covid highlight the fragility of our supply-chain model."

Consider Ford Motor Co. and its F-150 pickup, the bestselling vehicle in the U.S. The latest version is crammed with technology including a hybrid gas-electric drive and automatic Tesla-style software updates.

With vaccinations beginning to beat back Covid-19, customers bought around 200,000 F-150s in the first quarter of this year, its best retail start in 13 years. Yet now supply is short. Truck factories were shut down or had limited production for all of April and the slowdown will likely continue through at least mid-May. The hit to pretax profit is as much as $2.5 billion.



New Ford F-150 pickup trucks were unable to be sold because of the global shortage of semiconductor chips. PHOTO: JIM WEST/ZUMA PRESS

The basic idea of just in time is avoiding waste. By having suppliers deliver parts to the assembly line a few hours or days before they go into a vehicle, auto makers don't pay for what they don't use. They save on warehouses and the people to manage them.

But as supply chains get more global and car makers increasingly rely on single suppliers, the system has grown brittle. The crises are more frequent.

Freak snowstorm

A freak snowstorm in Texas in mid-February shut down a refinery that feeds production of 85% of resins produced in the U.S. Those resins go into components from car bumpers to steering wheels. They're some of the least expensive raw materials in a car, but they go into seat foam, and dealers can't sell a car without seats.

At the end of March, Toyota shut down production at several U.S. plants due to the shortage, according to a schedule seen by The Wall Street Journal, hitting production of some of its bestsellers, including the RAV4 sport-utility vehicle.

Some suppliers are flying in resin to the U.S. from Europe, said Sheldon Klein, a lawyer at the firm Butzel Long who advises suppliers. "That's just economically crushing," he said. "At best you have very sharp-elbow discussions with your customer about shouldering some of the cost."

Executives say they don't want to replace just in time entirely, because the savings are too great. But they are moving to undo it to some degree, focusing on areas of greatest vulnerability. They are seeking to stockpile more critical parts, especially if they are light and relatively inexpensive yet irreplaceable like semiconductors.

Ford's chief executive, Jim Farley, said he was looking at keeping more inventory. "Most other industries use safety stock for critical components like chips," he said at an event hosted by Automotive News. "And many of these companies pay for chips upfront, years and years ahead of the capacity requirements."

Three decades in the car business hadn't prepared Mr. Farley for this year. "It's shocking to me how much I've learned about the supply base," he said.

The shift to electric vehicles is adding pressure on car makers to rethink a half-century of automotive history, because these vehicles make heavy use of parts in the shortest supply, including lithium-ion batteries and semiconductors.

General Motors Co. and partner LG Chem Ltd. are building a $2.3 billion factory in Ohio and scouting a location for a second factory with the aim of producing enough batteries for hundreds of thousands of electric vehicles a year. Volkswagen, with its plans for six joint-venture battery factories, says it will order an additional $14 billion in batteries through 2030.

The companies are taking a page from the playbook of Tesla, which in turn was influenced by Silicon Valley. Tesla built a $5 billion battery factory called the Gigafactory in the Nevada desert with Panasonic Corp.

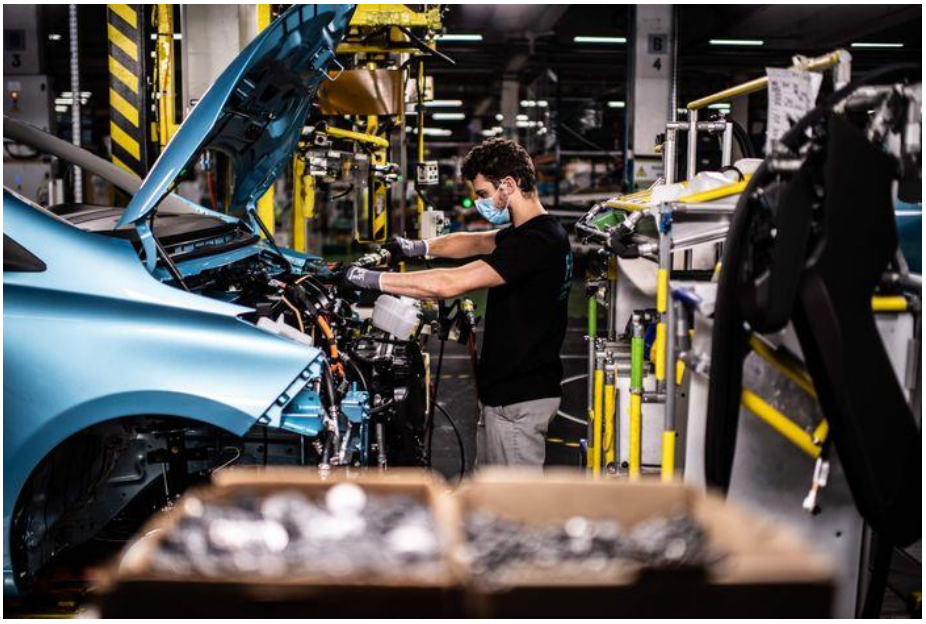
Of course, securing a direct battery supply doesn't solve every supply-chain issue. Even the most futuristic EV will still need plastic for floor mats, rubber for tires and leather or cloth for the seats.

Still, Tesla is trying to identify the most strategic materials and procure them on its own, a job that under traditional just-in-time production was left to suppliers. In September it signed a deal that would give it access to lithium from a mine in North Carolina under development.

Tesla's push

Tesla chief Elon Musk said last year he wanted to buy nickel directly too. "Tesla will give you a giant contract for a long period of time if you mine nickel efficiently and in an environmentally sensitive way," he said.

Mr. Musk's push into raw materials brings the car industry back a century, to the days when Henry Ford's assembly line was a forerunner in manufacturing techniques.



Work goes on at Renault's Flins-sur-Seine plant in France last year. PHOTO: MARTIN BUREAU/AGENCE FRANCE-PRESSE/GETTY IMAGES

In the 1920s, the state of the art at Ford was vertical integration, or control of all the things needed to make a car. Its Rouge River plant in Dearborn, Mich., made not just cars but the steel for the cars, which was forged from the output of Ford's iron mines.

After Henry Ford died, the company sold off its docks and steel forges. It was more efficient, car makers decided, to leave the business of steel, rubber and shipping to the companies that knew those businesses best. Making a car became more about purchasing the right parts and materials and assembling them.

Toyota pioneered the next step. One day in 1950, Toyota executive Taiichi Ohno visited an American supermarket and marveled how the shelves were restocked as they were emptied, as Jeffrey Liker recounts in his book "The Toyota Way." Shoppers were kept happy even though the supermarket had only small storerooms. It was the polar opposite of the car industry where warehouses were kept full of sheet metal and tires to ensure the assembly line never shut down.

Supermarkets had little choice, since they couldn't stockpile bananas for months. Still, Mr. Ohno reasoned, their practices eliminated waste and cut costs. Toyota would only pay for what it needed to produce cars for a day. That meant they could make do with smaller factories and warehouses.

Thus emerged the system later known as just in time. Each day a stream of trucks would pull up to Toyota's factories and disgorge just enough to cover a day's worth of production.

It was easier for Toyota to pull off, thanks to the coterie of loyal suppliers known as its keiretsu clustered around its factories. U.S. competitors were wary at first, but the system proved so efficient that every car maker from Detroit to Wolfsburg adopted a version. Ford

set up the Ford Production System to match the one named after Toyota. Top suppliers did too, for their own suppliers lower down the pyramid.

The idea spread through other industries. Apple Inc., McDonald's Corp. franchises and big box stores like Target Corp. all use some form of just in time to keep inventory low.

A sister idea to just in time was the use of single suppliers for many parts. These suppliers could master the daily dance of deliveries, cut costs through volume and service the global factory networks that the top car makers operate.

Carlos Tavares, the chief executive of Chrysler parent Stellantis, said in a March interview that the company estimated it bought about 400,000 parts for the 100 models in the lineups of Chrysler, Ram, Fiat, Peugeot and other brands. He said some 95% of those parts come from a single source.

"That's the norm in the automotive industry," Mr. Tavares said.

From time to time, events such as the 9/11 terrorist attacks would upend the system, but the industry mostly shrugged its shoulders and carried on because the rewards were too great.

The tide began to turn with the global financial crisis. At least 50 auto suppliers went bankrupt, catching car makers by surprise. When suppliers like Visteon Corp., a maker of air conditioners, radios and other components, declared bankruptcy, it led to fears that car factories relying on Visteon would also be unable to operate.

A different shock prompted a rethinking of just in time at the company where it started. The 2011 earthquake in northern Japan hit Toyota suppliers including chip maker Renesas Electronics Corp.

Camry vehicle wheels move down a conveyor belt at Toyota's manufacturing plant in Georgetown, Ken., in 2019. PHOTO: LUKE SHARRETT/BLOOMBERG NEWS

Spokeswoman Shino Yamada said that after the quake, the car maker pushed its suppliers to disclose who sells them their components—no mean feat in the auto industry, where suppliers tend to guard their own supply chains in case auto makers use that to push price cuts. Over time, Toyota built a database that it says covers some 400,000 items and reaches as far as 10 layers down.

Stockpiling parts

For certain components, Toyota asked its suppliers to stockpile parts, the antithesis of just in time. The on-hand inventory held by Toyota's largest supplier, Denso Corp., rose to around 50 days' worth of supply in the year ended March 2020, up from 38 days in 2011, according to its financial filings. Denso declined to comment on inventory figures but said it has started keeping emergency stores of parts, especially semiconductors.

Toyota's efforts have helped it weather this year's shortages of semiconductors better than many of its rivals, although it wasn't perfect. The same Renesas factory that got hit a decade ago by the earthquake shut down for a month after a fire in one clean room in March. Despite the help of thousands of employees from Toyota, Nissan and others, the factory won't fully recover until around July.

Now, just as they once emulated just in time, many car makers are trying to match Toyota's grasp of its network to catch hidden chokepoints.

"This is where procurement has frankly dropped the ball," said Bindiya Vakil, chief executive of software maker Resilinc, which helps manufacturers monitor supply-chain shortages. "Time and time again the stuff that brings us to our knees is not the expensive stuff, it's the tiny stuff that we don't manage closely."

Mike Colias in Detroit and Nick Kostov in Paris contributed to this article.

Write to Sean McLain at sean.mclain@wsj.com