THE BIG PIVOT

COVID is still with us. But the lessons learned from how firms worldwide pivoted in response to the pandemic are already shaping the future of supply chain management.

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To say that the COVID-19 pandemic has been an unprecedented global event is an understatement. It has affected all aspects of life in most countries. From a supply chain standpoint, it's difficult to imagine an industry that was not disrupted, and that did not experience unanticipated changes in demand and supply patterns. Shortages of toilet paper may have been the most visible, and personal, but since then, business has experienced shortages of everything from computer chips to the elastic used to make face masks.

When the global economy shut down, few retailers or manufacturers anticipated the dramatic increase in demand that occurred in the middle of 2021. For instance, automotive companies dialed back production capacity only to find shortages of critical components such as microprocessors when they decided to ramp up their production to normal levels. The demand for steel, lumber and home delivery of products increased dramatically as employees working at home decided to spruce up their kitchens, bathrooms and home offices. Companies as sophisticated as Apple were forced to lower their production forecasts for newer models of their phones.

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On the consumer side, retailers also had to change their operating procedures to comply with capacity and safety restrictions imposed by the Center for Disease Control and Prevention (CDC) and state and local governments. Customers walking into a store confronted a myriad of dos and don'ts: There were mask requirements, floor markers indicating where to stand to maintain social distancing, plexiglass dividers at checkout stations and hand sanitizers at entry and checkout. For a time, some businesses, such as Trader Joe's, limited the number of customers in their store at any one time, resulting in customers waiting outside for their turn to enter.

While changes at the grocery and drug store were immediately visible to the consumers, changes adopted in the workplace were not unless they worked there. For instance, manufacturers pivoted—they instituted new safety methods, testing their employees for virus symptoms and providing alternate work arrangements. Remarkably, companies also found ways to survive and even thrive by also pivoting from their standard offerings and reconfiguring product portfolios, creating new innovations or pursuing new business strategies. Their rapid responses to the pandemic are a testament to these companies' *speed* and *agility*, touted as cornerstones of great operations and supply chains. What is even more impressive is *how* they were able to respond so quickly. For this article, our research team focused on better understanding the enduring lessons we have learned from these pivots about supply chain innovations that can be applied in a post-COVID-19 environment.

We collected more than 500 news reports—greater than 100 from each of five major regions worldwide—and studied the strategies adopted by the firms. From the supply chain and resource management perspectives, two major strategies emerged from our analyses. Some firms responded to the immediate market demand with innovative standardization—a classic strategy in lean manufacturing—while others innovated to break market boundaries by pursuing different applications of technologies and processes that are adjacent to existing markets or fundamentally new markets.

We label these strategies as *pull innovations* and p*ush innovations* respectively. We discuss some examples of *push* and *pull* innovations that enabled organizations to explore new business opportunities during the pandemic. We also look beyond the pandemic to discuss recovery challenges and lessons learned that may stay with us for a long time. Much like the experiences during the Great Depression, the changes we collectively experienced during the pandemic may fundamentally alter consumption patterns and production methods.

Pull innovations to meet market demand for standardized products

Many of the companies we examined augmented their existing product lines and created new marketing campaigns to increase their profit potential, but they did not move too far away from their core competencies. They utilized the *existing* capacity of their production systems effectively and stayed profitable while offering new products that satisfied consumers' new needs. For example, U.S. companies such as Gap and New Balance, and European companies such as Burberry and Inditex, recognized customer demand for non-surgical face masks along with reduced demand for their usual products, so they quickly pivoted to add non-surgical facemasks to their product portfolio. Beverage firms Bundaberg and Archie Rose (in Australia); Bacardi and Moonrise distillery (in the U.S.); Diageo and Rockland distilleries (in Asia); and Distell (South Africa) repurposed equipment and capacities to produce hand sanitizers. Food and personal care producers such as Trisco and Fronterra (in Australia and New Zealand); Christian Dior, L'Oréal, and Puig (in Europe); and ITC and Godrej (in India) added hand sanitizers to their product portfolio.

We found many such examples that constitute a pull innovation, where the market dictated how much of what products were needed and companies reorganized their resources and processes to meet that demand. Through this, companies increased their throughput (number of products produced) and quickly pivoted to maintain their profitability. This thinking is *de rigueur* in both business schools and the world's leading manufacturing companies.

Even engineering-oriented companies focused on their core expertise to provide products that served their customers' urgent needs. For example, Johnson Controls equips hospitals with video surveillance systems, nurse call systems, fire alarms and wireless networks. A multi-disciplinary team at the company worked on a project to deliver a solution in 20 days that would normally have taken at least six months. The solution was a standard kit that can be fitted to a makeshift hospital after some customization in assembling the designs, materials and components, depending upon the makeshift hospital's structure. The faster speed was possible because the company *standardized* activities.

The Toyota production system has provided an example of extreme standardization of tasks, which ironically enables, rather than hinders, flexibility and creativity through experimentation and the scientific method. In this example, having a standardized kit enabled Johnson Controls to test and implement process modifications quickly to fit the requirements of the makeshift hospital. The multi-disciplinary team involved design, production, healthcare technology, logistics and installation experts. They communicated, coordinated and synchronized their work to complete the project in a fraction of the usual time.

While the pandemic has certainly created a need to develop new products, not all companies had such capabilities in-house. They needed support from their supply networks or logistics service providers to deliver much-needed products and services to their communities. The UK's Royal Mint, a coin manufacturer, began supplying medical visors to local hospitals. They attribute their success to a culture of continuous improvement, empowerment of their employees and strong supplier relationships—principles of lean manufacturing.

Shop floor employees, supported by their managers, developed strong problem-solving skills and were empowered to use them to develop community-oriented solutions. Although they used in-house capabilities to design and manufacture visors, they lacked the expertise to develop elastic bands for the visors and relied on their long-term supplier in Asia to procure this key component. The Royal Mint adapted its facilities and produced visors within a few weeks. On the first day, they made a visor every three minutes; by day 10, it was one every two seconds. Between April and July 2020, they delivered 1.9 million visors to the Local Health Boards in Wales.

Even small changes in supply chain processes mattered during the pandemic. Morrisons, a UK-based supermarket, changed their payment terms to pay their suppliers within 48 hours instead of the usual 14 days. These terms initially applied to suppliers with less than £100,000 of business per year. Later, they reclassified over 1000 suppliers with up to £1,000,000 of business per year to benefit from the modified payment terms. These actions helped Morrisons keep their existing supply chains intact to meet their customers' basic needs for food and other essential items.

The challenges brought by the pandemic also provided an opportunity for people, companies and communities to solve problems collectively. Some companies even set aside their profit motives and collaborated with competitors. The UK government created the "Ventilator Challenge"—bringing together large companies such as Ford, McLaren, Unilever, BAE, GKN Aerospace, Rolls-Royce, Unilever and Airbus—that quickly pivoted to build ventilators for the National Health Service (NHS) based on two existing designs from Smiths group and Penlon. Bringing together more than 30 of the UK's largest companies, the best talents and the latest technology allowed the firms to learn and scale up ventilator production quickly. Similarly, in the U.S., the Defense Production Act (invoked in April 2020) resulted in automakers such as Ford and GM partnering with healthcare manufacturers to increase the production of ventilators. They were able to deliver more than 69,000 ventilators by August 2020 as part of this initiative.

Push innovations to create new markets or fundamentally new products

The pandemic has given the entire world an opportunity to rethink how to do business. Although we might see the pandemic as having frozen the world, it also unfroze many conventions and provided an unprecedented opportunity to explore and experiment with business models.

Businesses and governments had to institute social distancing rules and new processes for *contactless* delivery of products and services. For example, Presto played a key role in supporting U.S. restaurants by providing a kit for taking remote orders. Using a smartphone, a customer can scan a QR code at the table to bring up the restaurant's menu. After dining, customers can use the same QR code to pay for the meal. These capabilities enabled restaurants to reduce labor costs, improve staff safety and productivity and enhance the customer experience. Similarly, India-based TechMax, a biometric and QR scanner device manufacturer, pivoted from their primary products to develop touchless elevator panels that enable users to point from a distance of 15-20mm, limiting the spread of the virus.

BioIntelliSense, a Denver-based digital health startup, developed a wearable sensor that remotely captures patient data and provides real-time data to clinicians to identify physiological changes in patients that may require intervention. The device is used to monitor COVID-19 patients but could also be deployed as a preventive healthcare intervention to monitor patients with special healthcare needs. Similarly, U.S.-based Estimote repurposed its existing wearable devices to provide contact-tracing technology via passive global positioning system (GPS) location tracking, proximity sensors powered by Bluetooth, and ultra-wide-band radio connectivity. In all of the above examples, the company anchored its processes on the constraints of its existing solutions to answer the vaguely defined problems triggered by the pandemic. Such approaches can also be used to produce innovative products and services more regularly.

Creating new markets does not always require technology-driven innovations. Some solutions require lateral thinking and providing customers with new alternatives. For instance, border closure with China created a steep drop in demand for the dragon fruit produced in Vietnam and Cambodia. Keen to support the local farmers and showcase the quality of local ingredients, Asia Bakery & Confectionery in Vietnam developed a dragon fruit baguette that was a huge hit among locals. In less than two weeks, they were able to use 30 metric tons of dragon fruit. KFC Vietnam noticed its success and began to order dragon fruit buns for its stores. In April 2020, when China's borders reopened, the price of dragon fruit had increased significantly because of the increased demand, benefiting local farmers.

Looking beyond the COVID-19 pandemic

The lessons learned during the pandemic are here to stay. From a technology perspective, companies like Indyme are preparing for a new normal in the post-pandemic world. The U.S.-based manufacturer of sensors and hardware repurposed its basic, contactless monitoring solution to manufacture a SmartDome security camera that measures the distance between people and sends an automated message to maintain social distance. Post-pandemic, the cameras could be deployed to monitor retail stores' aisles, entrances and checkout counters to ensure that an adequate number of cash registers are open to match customer demand.

At the start of the pandemic, many employees felt a sense of duty to do something to help their communities. Gripsport, an Australian manufacturer of bike racks, encouraged employee-led initiatives that helped repurpose their process to manufacture hand sanitizer dispensing stands. This idea originated from an employee during a brainstorming session. By so doing, the company utilized its spare production capacity and ensured that its staff remained employed through the pandemic. Similarly, Silicon Valley-based OhmniLabs Inc., a creator of flexible robotic modules and scalable additive manufacturing processes, brought together their team of engineers (electrical, mechanical and software) to build a robot used by healthcare providers to provide remote patient care. The engineers were cross-trained in production engineering, resulting in easier collaboration to adapt their product rapidly. These examples harken back to the fundamentals of lean and Toyota production systems, where empowering employees and relying on their talent can enable companies to develop innovative solutions and potentially new lines of business.

Many companies and their employees are experimenting with flexible work arrangements that allow their employees to live and work anywhere in the country (or even the world). Instead of having employees commute to work and spend long hours in traffic, employers are instituting work arrangements that do not require their employees to be in the office five days a week. For instance, Tata Consultancy Services (TCS), one of the outsourcing giants from India, announced that 75% of its more than 400,000-person workforce might permanently work from home even after pandemic restrictions end. These changes may benefit many of the small cities and towns that may retain talented young people. Even larger cities may benefit as pressures on the real estate market may ease due to these demographic shifts.

Recovery challenges

The recovery has not been as smooth as many hoped and expected, particularly with multiple new waves and variants of COVID-19. Lumber and steel shortages have slowed new housing starts and driven up housing prices. This, in turn, has drastically reduced the inventory of houses in the market to an all-time low, resulting in previously unseen bidding wars. There are also reports of resin shortages needed for electrical wiring, as resin manufacturers based in Texas and Louisiana had to shut down plants temporarily due to winter storm Uri.

At the beginning of the pandemic, many firms anticipated a drastic drop in demand and preemptively reduced their future orders from suppliers, and manufacturing plants had to reduce their capacity to abide by the new rules and regulations for social distancing. However, the drop in demand for many products never materialized; in many cases, it increased. Such mismatched demand-supply situations are causing delays in product and service delivery. Such delays are not limited to construction-related firms. The automotive industry is facing microprocessor shortages because the upstream supplier capacities reserved for automotive industries have been reallocated to firms in other industries such as gaming console manufacturers. This is causing challenges for automotive manufacturers to ramp up their production to pre-pandemic levels.

Similarly, logistics companies are facing cargo container shortages because they are stuck inland in many countries due to pandemic restrictions and have not been sent back to China (the primary producer for most of the world's economies). Such problems are causing a whiplash effect, where the shortages in supply or capacity are working through the supply chains (from upstream to downstream). Moreover, employers in some industries, such as restaurants and fast food, are finding it challenging to bring back employees due to augmented unemployment benefits, lingering wariness of the pandemic's effects and an inability to acquire childcare. These challenges are further compounding the recovery of already fragile supply chains.

The pandemic provided an opportunity for individuals, communities and businesses to adapt—and even thrive. Such adaptation (typically pull innovations) resulted from relatively simple solutions that were adjacent to existing product offerings (such as non-surgical masks or hand sanitizers) to more complex, technology-driven solutions (such as remote sensors). Push innovations may change the way consumers interact with companies as we move forward. The recovery challenges have raised important conversations within organizations on how to allow their employees the flexibility to work from home while maintaining a company culture that emerged when everyone worked at a single location.

As firms work through these recovery challenges, we believe that the lessons of pandemic driven innovations are here to stay.