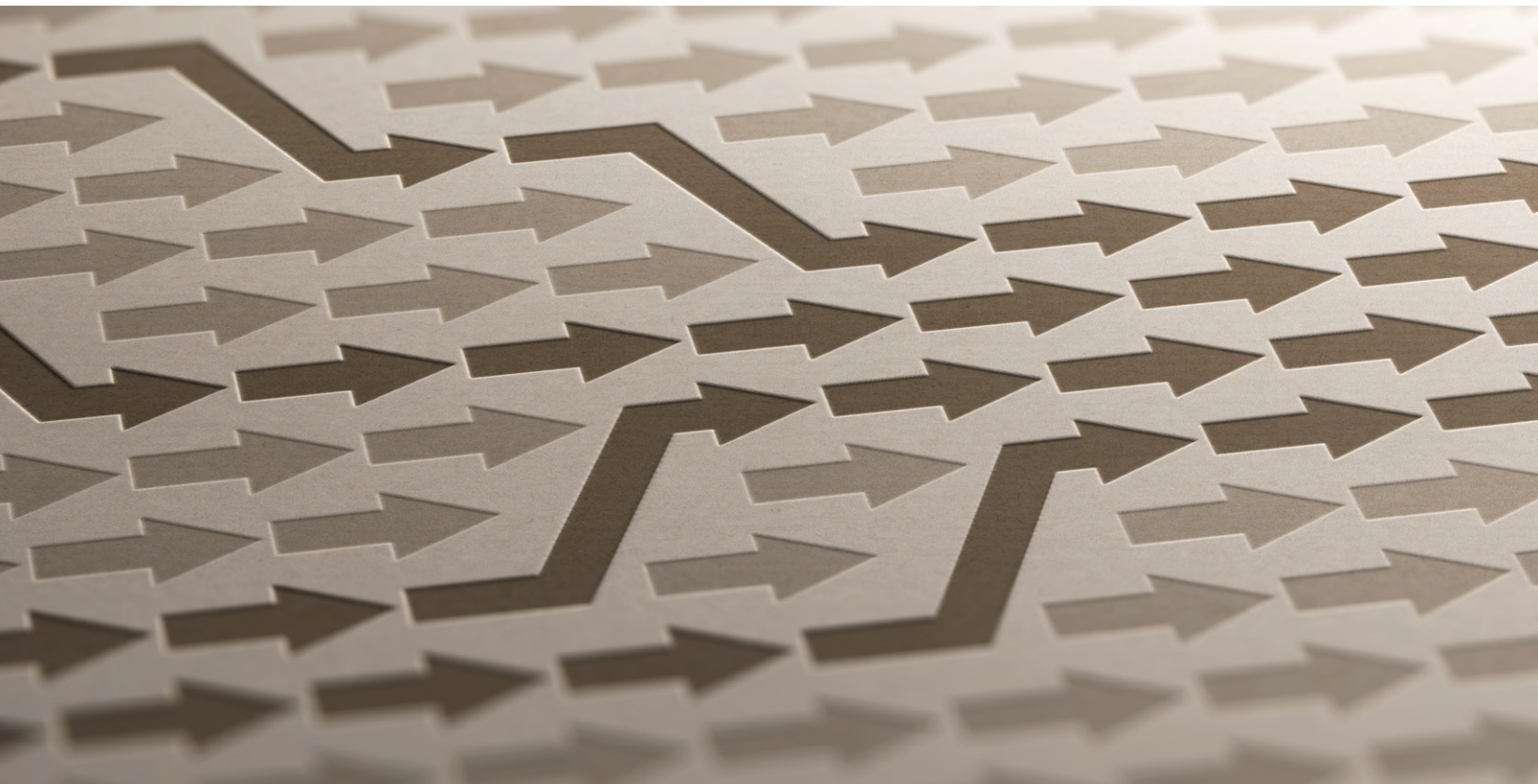


Operations Practice

# Supply chains: To build resilience, manage proactively

Supply chain upheavals show little sign of abating. Companies can address them by reconsidering outdated, short-term strategies and beginning the hard work of building structural resilience.

*This article is a collaborative effort by Knut Aliche, Cengiz Bayazit, Tim Beckhoff, Tacy Foster, and Mihir Mysore, representing views from McKinsey's Operations and Risk Management practices.*



**No one would dispute** that the COVID-19 pandemic created significant disruption to global supply chains. Nothing like this had happened in decades, and many operators relied on strategies that only partly addressed their challenges. Then came the Russian invasion of Ukraine, which has caused the greatest humanitarian crisis in Europe since the Second World War. Already, thousands of lives have been lost, and millions have been displaced—a tragedy with consequences that will unfold for years to come.

The invasion compounded supply chain troubles in critical sectors, including agriculture, automotive, energy, and food. As the frequency and magnitude of the disruptions increased, applying ad hoc remedies to restore predictability to a system premised on ever-increasing cost optimization became more difficult. To restore the needed resilience, supply chain operators may need to consider a range of options including structural reform.

So with good reason, the rapid decay of a decades-old model of supply chain reliability and efficiency is a key feature of CEO agendas. Over the course of a decade, companies may face disruptions that erase half a year's profits or more. For companies in most sectors, a single prolonged shock to production could wipe out 30 to 50 percent of one year's earnings before interest, taxes, and depreciation. Clogged ports, expensive cargo capacity, and emergency shipments became prevalent during the COVID-19 pandemic. Since then, the conflict in Ukraine has also contributed to product-line closures, transport delays, and spiraling input costs. These issues have contributed to large increases in commodity prices and a troublesome spike in inflation and in expectations for higher prices around the globe.

Yet these immediate effects are only part of the story. In fact, they may be overtaken in the long term by slower-moving but more permanent effects on supply chains occurring beneath the surface. Supply chain leaders could face challenges with short-term shocks while installing the building blocks of deeper structural reform. Nonetheless, structural reform may be the only way for leaders to restore

the resilience that companies depend on from their supply chains, as is evident from several of the short- and longer-term implications of the disruptions.

### **Key export categories are suffering immediate supply shocks**

Today, five categories of exports—agricultural products, chemicals, manufacturing, metals, and oil and gas—face three immediate challenges from the invasion of Ukraine:

- reduced production or shutdowns at many manufacturing plants
- lower purchases of goods sourced from Russia, because of economic sanctions or self-imposed sanctioning by companies
- logistics disruptions across air cargo, ports, road and rail, and shipping

These challenges have had an impact on product lines: for example, multiple automotive companies reduced production in Germany because wire-harness suppliers shut down. Transport delays and spiraling input costs have become more frequent. These immediate effects have spread across export sectors, but the impact appears to be highest for the automotive, chemicals, energy, food and agriculture, and travel and logistics sectors (exhibit). Some particular effects deserve to be highlighted.

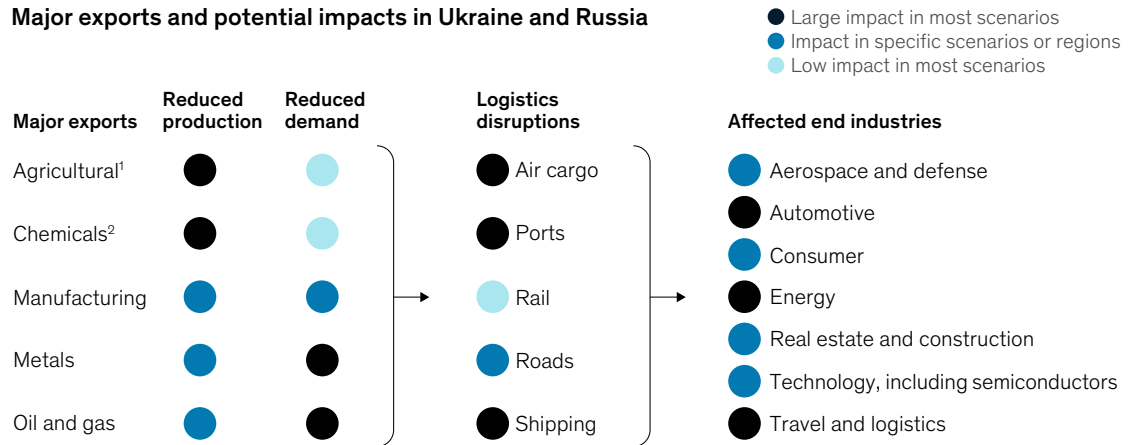
First, since the conflict began, many companies have announced that they are exiting operations in Russia or refusing to carry Russian goods. This level of self-imposed sanctioning is creating several effects, including greater unpredictability, since disruptions are harder to track and estimate.

Second, while many business leaders worry about rising inflation, they are also concerned about the unavailability of critical supply chain inputs because such shortfalls can shut down products and revenues. These effects will likely have a larger impact on companies than inflation but are harder to gauge in many supply chains and can occur quickly.

Exhibit

## The Ukraine–Russia conflict is having a major impact on supply chains in five key sectors.

### Major exports and potential impacts in Ukraine and Russia



<sup>1</sup>Only agricultural production, ie, crops.  
<sup>2</sup>Includes agricultural chemicals and fertilizer inputs.  
 Source: McKinsey Resilient Operations Center

Finally, many such effects are still rippling through supply chains, and their full impact may not become obvious for a few months. Some companies, for instance, have safety stocks for exported materials. As those stocks get depleted, disruptions may become more frequent.

These immediate effects are challenging. But leaders may also need to focus on the significant and long-lasting problems developing below the surface for supply chain operators.

### The longer-term threat to demand and critical-materials volume

As we have seen during the war in Ukraine, supply chain operators face several emerging developments that could pose a larger, more long-lasting challenge in the medium term. For example, an increased focus, particularly in Europe, on securing food, energy, and other critical materials will probably have a lasting effect on demand supply chains. Stockpiling items may provide a temporary

buffer, but eventually, a guaranteed source of supply—driving up costs—may be needed.

What's more, lockdowns during the COVID-19 pandemic, which contributed to shifts in consumer spending from services to products, are partly responsible for the current supply chain challenge. As demand begins shifting back to services, demand for products may decline. That could ease some of the pressure—but also adds to the overall uncertainty.

Lastly, demand for suppliers with lower carbon footprints or greener alternatives to existing products could rise as a result of the March 2022 US Securities and Exchange Commission ruling on carbon disclosures<sup>1</sup> (among other announcements), as well as Europe's continued focus on sustainability. Suppliers may have to shift their inventory management strategies in the coming years.

Taken together, such factors will be a durable underlying source of supply chain disruptions, which will evolve over time. As the impact of the

<sup>1</sup> On March 21, 2022, the US Securities and Exchange Commission proposed rule changes that would require registrants to include certain climate-related disclosures in their registration statements and periodic reports. This information would include greenhouse-gas emissions, a commonly used metric to assess a registrant's exposure to climate risks.

conflict in Ukraine continues to develop, these problems may even get worse. Therefore, one consideration for business leaders is how to stabilize the immediate disruptions while building resilience against future ones.

### Three steps to optimal resilience

Short-term solutions could work at a time when supply chains were more predictable than they are today. Preparing for long-term uncertainty and possible upheaval may encourage companies to build resilience into their supply chains. This process could evolve in three stages:

#### Firefighting

One potential response to supply chain problems is to focus on short-term, day-to-day actions, such as expedited delivery services to meet demand or speeding up production by purchasing components on an emergency basis. These tactics can help to some degree, particularly for identifying previously overlooked supply chain gaps. However, they don't build resilience and aren't fundamentally new, so overstretched suppliers may be reluctant to use them.

In such cases, CEOs could consider implementing cross-silo efforts that ensure an agile response to fast-moving events. They could also exhort teams and suppliers to not only adopt appropriate short-term measures but also stay the course for the more difficult long-term reforms, which begin during the second stage.

#### Integrating and streamlining operations

In this stage, three actions can be critical to building resilient supply chains: creating a nerve center for the supply chain, simulating and planning for extreme disruptions, and reevaluating just-in-time strategies.

*Create a nerve center to consolidate organizational responses.* A cross-functional team for such a nerve center coordinates and manages proactive responses to issues that might range from caring for distressed colleagues to testing financial stability under a range of scenarios. The nerve center could be organized under four categories: people, operating cadence, decision-enabling tools, and an early-warning system, which could, for example, signal potential political developments or cyberthreats, as well as compliance or regulatory issues (see sidebar "Designing an integrated nerve center").

## Designing an integrated nerve center

### People

- *Nerve center organization:* Outline the response, with clear owners and accountabilities.
- *Decision authority:* Clarify any changes in decision authority needed to guide response.

### Operating cadence

- *Weekly meeting calendar:* Set up key meetings to ensure an integrated response and connections across multiple efforts.

### Decision-enabling tools

- *Situation report:* Create a regular memo that details the current situation,

how it may evolve, and the immediate decisions needed.

- *Trigger-based actions:* Proactively define strategic actions that may be needed as the situation evolves.
- *Initiative tracking:* Describe the status of cross-silo initiatives that are relevant to the effort.

### Early warning system

- *Situational awareness:* Cover any relevant developments and broader economic and social factors.
- *Supply chain disruption monitor:* Serve as a single source of truth for supply

chain disruptions, covering events from source to end market.

- *Sanctions compliance monitoring:* Track the latest sanctions and actions needed for compliance from suppliers, partners, and customers.
- *Cybersecurity monitor:* Ensure readiness for potential attacks and implement advanced threat detection.

Source: McKinsey Resilient Operations Center

**Simulate and plan for extreme supply-and-demand disruptions.** This second category of actions involves ordering components earlier than usual and allowing extra time for delivery; accounting for the higher cost of energy, materials, and transportation; and checking inventories of critical materials to reprioritize production should shortages seem inevitable. If logistics disruptions are likely, try to get capacity on alternative routes. Another tactic to avoid building up excess inventory is simulating the effects of regional demand shifts on production. Examine the risks in supplier networks, labor, manufacturing, and delivery to determine if any part of the value chain is exposed to internal or external disruptions. Set up controls to minimize their effects.

**Reevaluate just-in-time inventory strategies.** If a crisis on the scale of the pandemic occurs, the absence of a back stock of inventory or materials can seriously threaten supply chains. Many of today's most pressing supply shortages (semiconductors, for example) occur in supplier subtiers where manufacturers have little visibility. To achieve transparency beyond the first tier, companies could work to identify suppliers from spending data, N-tier mapping, or both. Prioritize them by their importance to the business and assess their vulnerability. Some potential measures to mitigate risk include finding new suppliers, redesigning networks, resetting inventory targets, keeping safety stocks, and sourcing locally or regionally.

### **Achieving structural resilience**

CEOs and other top executives may focus on quick responses during a crisis but may also need to consider the difficult concern of building longer-term resilience. Transparency may be hard to attain. Diversifying the supplier base, though critical for resilience, is expensive. And the cost of keeping safety stocks on hand may be hard to justify if they are not used in several years. These issues are real and can make the task of building resilience in supply chains feel like wading through molasses, but leaders may have to continue to focus on them. (See sidebar "Creating long-term resilience in a high-tech supply chain: A case study," to learn how one global telecom maker structured a strategy to protect itself from shortages of raw materials.)

Some ideas and proven techniques can help with the difficult work of building long-term supply chain resilience, such as the following:

**Construct a 'digital twin' of the most critical parts of a supply chain.** A digital twin is a virtual replica of a business's operation that allows companies to simulate how a product, process, or service will perform before it is implemented in the real world. If building a digital twin isn't feasible, two models could be constructed: one to estimate the current flow of Ukrainian or Russian commodities and materials that may be going into an organization's products, and the other to show where a product

## **Creating long-term resilience in a high-tech supply chain: A case study**

**After experiencing significant** supply chain disruptions from COVID-19, a global telecom company focused on going beyond building up inventory. In its efforts to develop end-to-end supply chain resilience, two areas took priority: changing supplier contracts to ensure maximum agility and transparency, and reducing the share of components sourced from any single supplier. The company already had dual suppliers for components

but decided to go a step further by adding a production model using two different designs for the same products. This dual-source, dual-design strategy would provide the highest level of protection against raw-material shortages.

The next step was to evaluate the R&D outlay for the designs and to balance it with lower inventory-holding costs. The

company conducted a pilot to test this approach and assess its feasibility for other products. It also drew up a sales model based on its exposure to the risks of the dual-design, dual-sourcing effort. In this way, the company developed the flexibility to expand its supplier base if necessary and to increase its sales volumes and gross margins.

# One option to help mitigate longer-term, more permanent damage from supply chain disruptions is to maintain a strategic priority on customers.

originates in the value chain. This approach can help organizations pinpoint hidden suppliers or materials flows and expose previously invisible interdependencies.

*Create and test 'what if' scenarios.* Suppose you want to find out what would happen if the shift from rail to sea transport reduced the supply of vessels by 25 percent. One technique you may want to consider is building several what-if scenarios that can be tested quickly and then prioritizing and mitigating the parts of the supply chain that fail most often. It may seem daunting to create a large number of scenarios nearly continuously, at varying levels of detail and impact, but that is critical for this technique to provide insights. The vulnerabilities it reveals may make a big difference, but leaders shouldn't expect any one scenario to play out.

*Increase data sharing with suppliers.* To minimize risk when sharing data, businesses could consider terms that require the disclosure of data under specific conditions. Even if data sharing is restricted, companies may be able to have clean teams share data with a third-party firm that analyzes the supply chain for weaknesses and provides recommendations.

*Consider ringfencing a small part of the supply chain team.* Charge this subgroup solely with

building long-term resilience, not resolving day-to-day supply chain issues.

## **Tackling the medium-term challenge**

One option to help mitigate longer-term, more permanent damage from supply chain disruptions is to maintain a strategic priority on customers. There are several reasons for this.

First, e-commerce, by itself, doesn't necessarily promote positive outcomes. Our research shows that many retailers whose online sales increased during the COVID-19 pandemic also experienced pressure on supply chains and high fulfillment costs that eroded profitability. One avenue for success in e-commerce is capturing high-value demand at an acceptable margin, depending on product and business model.

Second, the global economy may slow down in the coming year. The United States, for example, is posting strong growth and job creation numbers, but indicators of slackening demand have appeared. Prices in several sectors are spiraling quickly. The US Federal Reserve has raised interest rates to curb rising inflation.<sup>2</sup> In the eurozone, many observers suggest that a recession may be possible,<sup>3</sup> linked to several factors including the ongoing impact of the conflict in Ukraine.

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<sup>2</sup> Scott Horsley, "The Fed raises interest rates by the most in over 20 years to fight inflation," NPR, May 4, 2022.

<sup>3</sup> John Kemp, "Global recession risks rise after Russia invades Ukraine," Reuters, March 6, 2022.

Third, past economic downturns suggest that customers tend to stick with companies that stay closest to their core offerings. During the recession of 2008–09, for example, one company closed a number of stores but increased its investment in those that stayed open, catering especially to its core segment. By contrast, its competitor sought to use the recession to enter a segment that was not part of its historical core. The company that stayed with its core customers emerged from the downturn far stronger than its competitor and grew significantly in the postrecession years.

CEOs recognize that none of these actions come without costs and that it may be hard to count on visions of long-term resilience to pay for the investments required to achieve it. After the experience of the past two-plus years, chief executives may need to define the circumstances in which they think consumers would pay a premium to ensure the availability of goods. They could also consider exploring whether suppliers will accept discounts to help ensure demand for their products and absorb the costs through more productive operations. Perhaps the hardest task for CEOs could be convincing investors to accept resilience as the new table stakes and to change their view of expected risk-adjusted returns.

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*Russia's invasion of Ukraine in February 2022 is having deep human, social, and economic impact across countries and sectors. The implications of the invasion are rapidly evolving and are inherently uncertain.*

*As a result, this document, and the data and analysis it sets out, should be treated as a best-efforts perspective at a specific point in time, which seeks to help inform discussion and decisions taken by leaders of relevant organizations. The document does not set out economic or geopolitical forecasts and should not be treated as doing so. It also does not provide legal analysis, including but not limited to legal advice on sanctions or export control issues.*

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