Harvard Business Review
ANALYTIC SERVICES

PULSE SURVEY

Forecasting in Flux:

Navigating Uncertainty through Strategic Supply Chain Flexibility

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Forecasting is hard. Now, with ever-evolving consumer demands and global macroeconomic uncertainty, it's even harder.

Research from Harvard Business Review Analytic Services, sponsored by Flexe, shows inaccurate forecasts are most commonly due to:

- Extreme events: 62% of respondents cite disruptive events, such as the pandemic.
- Shifts in consumer demands: 43% cite shifts in consumer demand, behavior, and preferences.
- Bad data: 39% cite struggling with inaccurate data.

Unfortunately, bad forecasts undermine even the best-laid plans. Over the past three years, 98% of executives say their organization has faced one or more detrimental effects, from material shortages to missed revenue opportunities to decreased customer satisfaction and profitability, due to bad forecasts.

In particular, forecast issues cause significant supply chain problems—ranging from production to warehousing and distribution to fulfillment. Traditional supply chains struggle to adapt to fast-changing, dynamic markets. And it's not getting better.

But there is a path forward: supply chain flexibility. Eighty-two percent of executives agree that flexible supply chains help organizations like theirs adapt to inaccurate forecasts. By separating logistics from locations, innovative organizations gain the flexibility to test new strategies, manage disruptions, and avoid risky fixed-cost investments.

This report explores today's forecasting challenges, their enterprise impacts, and the value found in flexible supply chains. Discover:

- The common causes of forecast challenges
- The business impacts of inaccurate forecasts
- Steps to meet—and overcome—these challenges
- Methods to increase customer satisfaction and reduce risk through supply chain flexibility

ABOUT FLEXE

Flexe solves the most difficult omnichannel logistics problems for the world's largest retailers and brands.

Integrating technology, open logistics networks, and elastic economic models allows Flexe customers to move fast, at scale and with precision. Founded in 2013 and headquartered in Seattle, Flexe brings deep logistics expertise and enterprise-grade technology to deliver innovative e-commerce fulfillment, retail distribution, and network capacity programs to the Fortune 500.

Karl Siebrecht
Chief Executive Officer
Flexe

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Since early 2020, supply chain disruptions have captured global attention like never before. Newspaper headlines reported dramatic events ranging from surging toilet paper demand to empty store shelves to a ship blocking the Suez Canal. These events only worsened the existing global supply chain crisis. Much of the disruption was pandemic-related, but it hasn't waned nearly as much as Covid-19 has. Many organizations find that supply chain volatility and uncertainty are part of the new normal.

Consequently, companies find it difficult to accurately predict demand. In February 2023, Harvard Business Review Analytic Services conducted a global survey of 459 respondents familiar with their organizations' supply chain operations. The survey found that of those whose organizations execute demand forecasts, 69% say, on average, the accuracy of their demand forecasts has been below 80% over the past three years. And respondents are not particularly pleased by this result; only 8% indicate that they are "very satisfied" with the average level of accuracy of their organization's demand forecasts.

Indeed, forecasts are inherently wrong. The questions often are just how wrong a forecast will be and when that failure will occur. "Companies are never going to get the forecast accuracy they want. There are always going to be surprises," says Steve Banker, vice president of supply chain services at Dedham, Mass.-based ARC Advisory Group. "Therefore, flexibility, agility, and the adaptive mindset of an organization are critical. As President Eisenhower, reflecting on his military career, expressed: 'Plans are worthless, but planning is everything.'"

HIGHLIGHTS

98% of respondents whose organizations measure forecast inaccuracy say their organizations faced at least one supply chain issue as a result of **inaccurate demand forecasts over the past three years**.

82% agree that having a **flexible supply chain can help organizations like theirs respond or adapt** to inaccurate demand forecasts.

52% of respondents who indicate that their organization is **actively increasing flexibility** say these efforts have **reduced risk**, and the same percentage say they've **increased customer/consumer satisfaction**.

Due to rounding, some figures in this report may not add up to 100%.

One of the implications of forecast inaccuracy is that organizations frequently make supply chain decisions based on incorrect data. In addition, the impacts of forecast inaccuracy are real, omnipresent, and often detrimental to the bottom line. But there does seem to be a solution that can help organizations overcome this predicament—a flexible supply chain. A correlation exists between having a flexible supply chain and the ability to solve problems arising from inaccurate forecasts. Flexibility can also help organizations recover more quickly from disruption, reduce risk, and even increase customer satisfaction.

This Harvard Business Review Analytic Services report will examine forecasting accuracy and the effects that forecasting error can have on an organization and its supply chain. It will investigate ways that organizations can mitigate any negative effects. It will also look at the concept of supply chain flexibility and explore how more pliable supply chains and logistics networks can help organizations overcome forecasting challenges and take advantage of opportunities that may arise in today's world of surprises.

According to Bob Ferrari, vice president and managing director of Boston-based Ferrari Consulting and Research Group, having a plan to deal with disruption is of far greater value than relying on forecasts to make critical decisions. "Nobody could have planned for the pandemic—it was a black swan," he says. "And many organizations feel that there is no need to plan for a scenario like that, as it may only happen once in a lifetime. But you need to have processes in place to deal with the unexpected—and that's not forecasting. That's way beyond forecasting."

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Extreme Events Changed the Game

It is difficult for organizations to predict demand and plan operations if they can't be certain about what lies ahead. Lisa Anderson, founder of Claremont, Calif.-based LMA Consulting, says the military term "VUCA"—volatile, uncertain, complex, and ambiguous—best describes global supply chains at present. "Since the pandemic, new issues have arisen—the Russia-Ukraine war, for example—that are causing issues in many supply chains," she says. "Oil and natural gas are used in the production of multiple products, and this affects everything from medical devices to fertilizer and food production. When you add the heightened tensions between the U.S. and China, and extreme weather events, the picture is one of continued disruption. We have to stop waiting for it to end. It's not going to end."

According to Ferrari Consulting's Ferrari, traditional forecasting is no longer suited to today's environment. "Demand forecasting was predicated on a very stable product with not a lot of variation in demand. In these conditions, companies built a set of information that was very consistent, even when factoring in seasonality," he says. "But very few companies have that kind of predictable demand cycle today. In fact, more now have the opposite."

The survey found that most commonly, forecasts are thought to be inaccurate due to extreme events and unpredictable consumer behavior. Of those whose organizations measure the accuracy of demand forecasts, extreme events, including the pandemic, are cited by 62% of respondents as being one of the main causes of forecast inaccuracies over the past three years. Unpredictable changes in consumer demand, behavior, or product preferences (43%), along with a lack of accurate data (39%), are also significant contributors to forecasting error.

This unpredictable environment has changed the nature of forecasting and planning. "Supply chain planners would spend a lot of time sifting through information to figure out if they had all the data, and whether or not it was accurate—so much so that when the plan came out, it was already obsolete because things had changed," says Ferrari. "Today, the role of a supply chain planner has changed dramatically. It's now a strategist's role. It involves continuous planning, continuous sensing of demand and supply, and linking that ebb and flow to execution."

In practice, this change in approach means that some organizations are focusing more on adjusting to scenarios as they unfold. "If demand is shifting—perhaps a particular product is gaining traction—then planners are asking, 'Do we currently have enough supply in the network for that? If not, let's look at options for securing supply and evaluate options for placing the product where it's needed, locally, regionally, or globally,'" he continues. "That takes strategic thinking."

Rosemary Coates, executive director of the Reshoring Institute, a nonprofit and nonpartisan organization that supports companies starting, restarting, or expanding manufacturing in the United States, believes that companies are looking at forecasting in a new light. "In the past, organizations relied pretty heavily on forecasts—and those were primarily sales forecasts—that did not take the supply side of the supply chain into consideration. The pandemic showed us that forecasts are not based on reality in terms of whether or not you can actually acquire all the goods that you need to make a product in today's environment," she says. "Now, companies are becoming far more aware of their supply chain partners and how that affects the total operation of the business, across sales and order fulfillment to marketing. Companies are not throwing traditional forecasting out the window, but instead including more supply chain variables and becoming far smarter about adjusting supply chains to make sure they can meet forecasts and customer commitments."

The Cost of Getting It Wrong

Decisions based on forecasts with a high level of error can have negative, and costly, consequences. Manufacturers and retailers could produce or buy too much inventory, leading to reduced profits; conversely, too little inventory leads to lost sales. Companies also may have to carry more just-in-case inventory that ties up cash and monopolizes warehousing space. Incorrect forecasts affect logistics and warehousing, too, as businesses take on the balancing act of getting the right amount of inventory to each location across geographies.

Since early 2020, decisions based on inaccurate forecasts have had detrimental effects for 98% of those polled. According to respondents, the top problems caused by inaccurate forecasts are shortages of materials/inventory (57%); bottom-line financial impacts, including missed revenue opportunities (45%); and decreased profitability (42%). Damage to customer satisfaction (39%) is also high on the list. **FIGURE 1**

ARC Advisory Group's Banker asserts that if businesses cannot respond to market changes or adjust for inaccurate forecasts, one of the most common consequences is a negative effect on order fulfillment—and consequently, unhappy customers. "If demand surges and you can't fulfill that order in a timely manner, your customer may go to a competitor. So, instead of an unexpected opportunity making you stronger, it makes your competitor stronger," he says. "When a business starts to get lower Net Promoter Scores than its peers, or when customer satisfaction rates are dropping, chances are the company is not getting goods to customers when they want them or in the quantities they want—and often, a lack of flexible fulfillment is part of the problem."

The Value of Flexibility

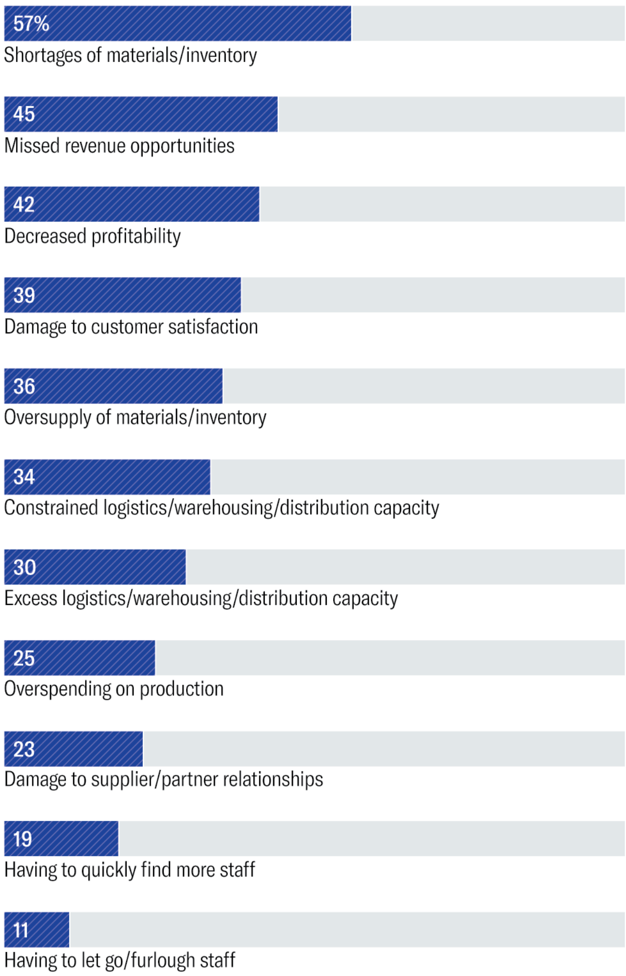
Greater flexibility across an organization's supply chain—from suppliers to production, sales, warehousing, and distribution—can help organizations adapt to unforeseen circumstances.

FIGURE 1

Forecast Inaccuracy Can Be Detrimental

Organizations most significantly suffer shortages of materials or inventory as a result

Over the past three years, what supply chain issues has your organization faced as a result of inaccurate demand forecasts, if any? [Select all that apply.]



Base: 327 respondents whose organizations measure the accuracy of demand forecasts.

Source: Harvard Business Review Analytic Services survey, February 2023

Survey respondents overwhelmingly acknowledge the connection between a flexible supply chain and the ability to adapt to change, as 82% of all respondents (regardless of whether their organization currently has a flexible supply chain) agree that having a flexible supply chain can help organizations like theirs respond or adapt to inaccurate demand forecasts. Many of them have witnessed supply chain adaptability in practice. When asked about the last time their organization had to alter its supply chain operations to adapt to an inaccurate demand forecast, 76% of respondents who describe their organization's supply chain as flexible say they "very successfully" or "somewhat successfully" adapted. By comparison, fewer of the respondents who consider their supply chain to be fixed say the same: 65%.

LMA Consulting's Anderson believes that flexibility helps companies respond to disruption and provides opportunities for growth. "Smart companies are building in flexibility across all areas of the supply chain. For example, they are finding backup suppliers to secure supply in times of disruption, looking at reshoring or nearshoring to move production closer to where it is needed, assessing automation and adding a third shift for flexibility in meeting last-minute orders, and figuring out who their most important customers are and putting conditions in place to serve them better," she says. "Those companies that get ahead of these issues will have a lot of opportunity for growth because the rest of the folks are not going to be prepared for the next wave of disruption, whatever that may be."

Volatility itself may not necessarily be a bad thing, since it can bring opportunity with it—like an overnight social media sensation causing an unexpected spike in demand for a specific product, or the pandemic-related shift to online shopping that pushed many businesses to establish or extend their online presence and reach new customers in new markets. In fact, most survey respondents (60%) agree with the idea that in the past three years, volatility/unpredictability has led to new opportunities for their organization.

Taking advantage of opportunities requires flexibility, which is really key for organizations to make the most of any situation. "There can be upside and downside surprises," says Banker. "Organizations need to quickly determine how to respond to any situation in the most profitable manner."

According to Dale Rogers, professor of logistics and supply chain management at Arizona State University's W. P. Carey School of Business, flexibility may involve some trial and error. Companies may have to trial run alternative suppliers, consider contract manufacturing for certain products or components, or bring on new supply chain technologies or partners. "Essentially, flexibility is figuring out new ways to do things," he says. "To some extent, companies are figuring out how to fail faster. The important thing is to try something new, quickly assess if it works or not, and if it doesn't, then move on to something else."

In a fast-paced environment, having the flexibility to try out new strategies is likely to pay off. "Today, there is definitely a premium on being flexible, agile, and resilient," says Rogers. "Yes, the world is volatile, and the rate of change seems to be faster than ever before, but it's a really exciting time. New source markets are opening up, and new regions are offering new customers. This environment calls for a different response than what we've been doing for the past 30 or 40 years."

The survey reveals that change is underway, as many organizations are looking to increase flexibility. The majority are putting the effort in, with 76% of respondents saying work has begun on increasing their organization's supply chain flexibility. Only 4% say their organization isn't even considering such changes. Overall, supply chain flexibility is being prioritized by executives, as 67% of respondents agree that increasing the flexibility of their supply chain is a high priority for their organization's leadership.

What Flexibility Looks Like

The Reshoring Institute's Coates notes that one sign organizations are pursuing flexibility and risk reduction is that global supply chains are getting shorter. "Companies are rethinking their global strategy to become more flexible," she explains. "One way to do this is to move manufacturing closer to the market in which the company is selling its products, so long global supply chains are being shortened by nearshoring or reshoring."

Today, manufacturers are looking for greater flexibility to guard against the supply chain vulnerability that was exposed during the pandemic: namely, a lack of diversification when it came to global sourcing and production facilities. "For decades, American companies wanted to only manufacture in China," Coates says. "Today, those same companies are having strategic conversations around mitigating risk—for instance, by manufacturing in two or three places around the world and developing supply chains in support of each of those manufacturing sites."

Finding alternatives to increase flexibility extends to the downstream end of the supply chain, too, namely when it comes to expanding distribution networks. "Companies want to be closer to their customers. One of the innovations in this regard is that companies are beginning to have a portfolio of supply sources *and* a portfolio of distribution options," says Rogers. "Traditionally, companies would have a few large distribution centers for each region. Now companies need other types of distribution to better supply the market. For example, they may add smaller facilities to complement existing infrastructure or even set up temporary facilities for seasonal peaks."

Rogers adds that this agile approach to distribution requires a new mindset. "Instead of static, fixed systems that consist of expensive assets like large distribution centers, companies can look at warehousing and distribution on a more temporary basis, where they pop up and pop down facilities depending on demand. That's not a muscle that many organizations have had."

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Dale Rogers, professor of logistics and supply chain management at Arizona State University’s W. P. Carey School of Business

Ferrari describes how organizations are taking a more flexible approach to product design, and this shift, too, demands new manufacturing and distribution strategies. "Building flexibility and resiliency into supply chains begins with analysis of product demand globally," he asserts. "Find out where you have major demand, and that's where you want to put the bulk of your flexibility in terms of fulfillment. Then, you could pre-position inventory within the region. Additionally, companies are using a push-pull supply chain strategy, suitable for products that are configured differently for customers in specific regions. You produce the product, with basic functionality, and ship that as inventory for the region. Then as orders come in, you can produce the last configuration of the product—a keyboard in another language, for instance—at the distribution center."

Reduced Disruption and Other Benefits

Recovering from disruption and reducing risk stand out as clear advantages of flexibility. The vast majority of all survey respondents (not just those who have flexible supply chains) agree that having a flexible supply chain can help an organization like theirs recover quickly from disruption (83%) and reduce risk (84%).

For those organizations that have made supply chains and logistics networks more flexible, the benefits are clear—and there are a variety of them. For instance, half or more of the respondents who say their organization has already begun work to increase flexibility cite benefits such as the ability to respond more quickly to disruption (61%) and reduce risk (52%). But supply chain flexibility is not only about responding to negative disruption; there are also positive, proactive benefits. Increased flexibility can help organizations innovate, expand, and keep customers happy. Respondents who say their organization is working to increase flexibility indicate that these efforts have helped the organization increase customer/consumer satisfaction (52%), reduce operating costs/increase profitability (50%), improve inventory levels (46%), and achieve faster order fulfillment (45%). Other benefits include innovations such as serving new markets or locations (29%), launching new products (24%), and being able to more easily test new strategies (24%). **FIGURE 2**

Nor is it just those who *already* have made their supply chains more flexible who see its potential for testing and learning: 73% of the total survey group agree that a flexible supply chain can allow organizations like theirs to test strategies they otherwise couldn't.

Flexibility in Practice

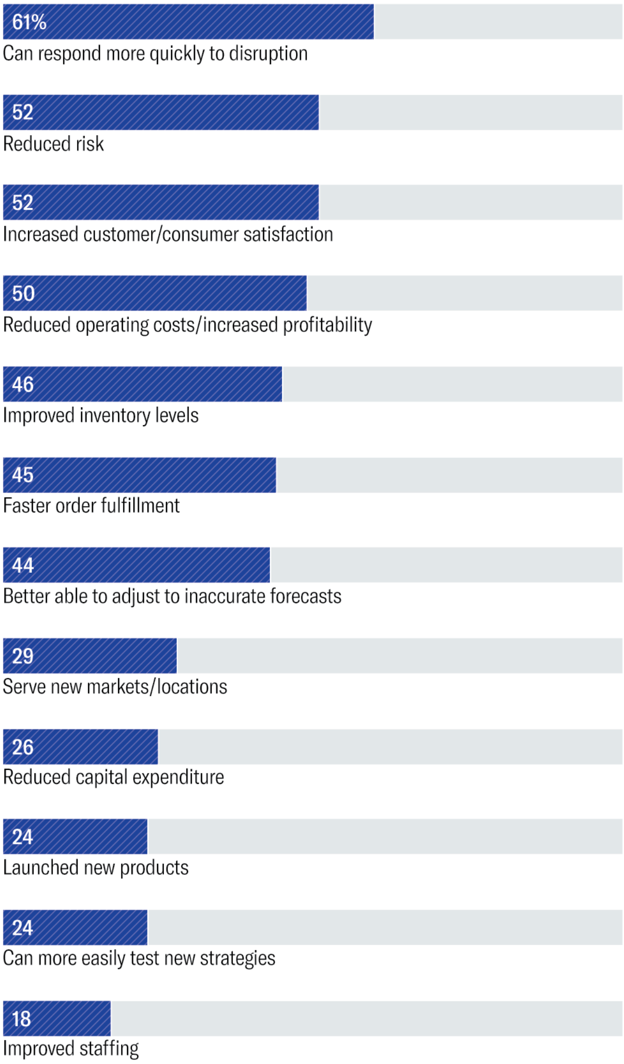
Banker believes that flexibility stems from taking a scenario-based approach to planning and then making sure that options are available to support those plans. "Businesses looking to build flexibility can start with an integrated business planning process that develops a basic forecast for the coming months. Based on that, the company can assess what is likely

FIGURE 2

A Variety of Benefits

Faster response to disruption is the leading positive from increased supply chain flexibility

What benefits has your organization realized from increasing the flexibility of its supply chain model? [Select all that apply.]



Base: 347 respondents whose organizations are increasing the flexibility of their supply chain models.

Source: Harvard Business Review Analytic Services survey, February 2023

"Organizations have many competing priorities, which is a major barrier to action. ... You have to have an innovative culture to try something new," says Lisa Anderson, founder of LMA Consulting.

to happen—a base case—as well as a worst-case and a best-case scenario, and plan for all those eventualities," he says. "Such scenario planning should factor in supply risks, demand fluctuations, and logistics constraints. There are also tools that can help with developing plans for each scenario based on where your factories are located, where your warehouses are located, and what the costs are for any just-in-time storage locations that you might need."

Banker asserts that it's not enough to have a playbook for how to shift manufacturing, change distribution routes, or use new storage locations. "Organizations actually need to practice from time to time," he says, "and see how fast they can respond."

Survey respondents say that when needing to respond to circumstances, such as high levels of forecast error, their organizations have employed a variety of solutions. The most common include using new or additional suppliers/manufacturers (41%) and adjusting a pricing or sales strategy to move excess inventory (33%). Other solutions at the top half of the list include using new or additional third-party logistics providers (29%), accelerating production or investing in extra inventory (29%), and investing in additional warehouse space or overflow options (28%). **FIGURE 3**

Obstacles Are Mostly Cultural

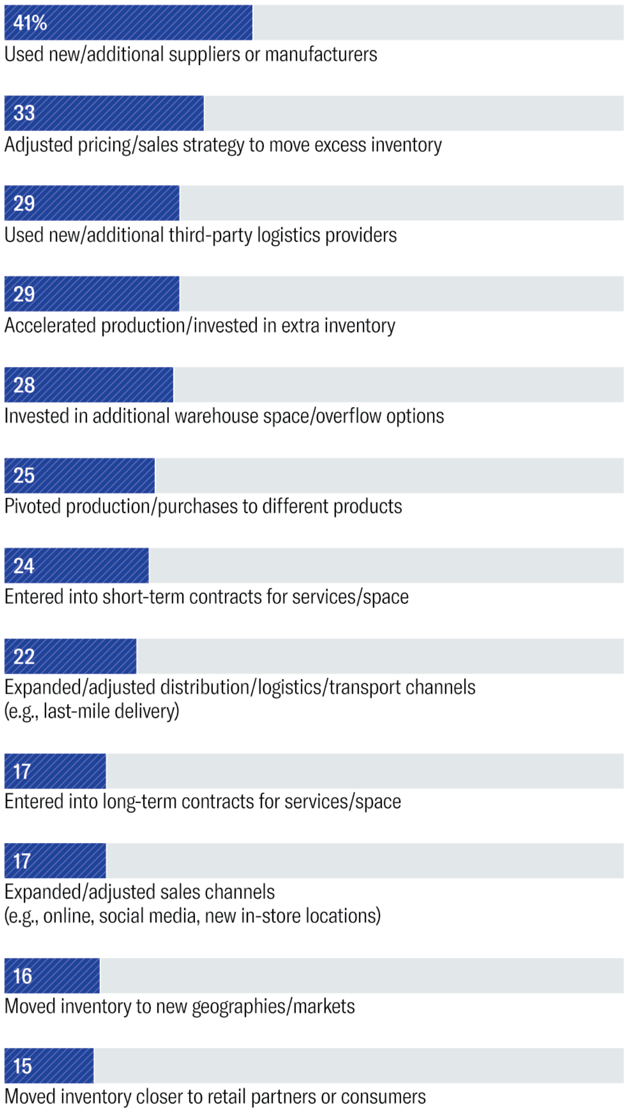
Although increasing supply chain flexibility is a top priority for many organizations, and its benefits are clear, there are obstacles that stand in the way of doing so. Anderson believes that while a lack of resources or technology may hold organizations back from making supply chains more flexible, the biggest barriers to change are cultural. "Organizations have many competing priorities, which is a major barrier to action, and what's more, change is not for the faint of heart," she says. "Essentially it comes down to a willingness to innovate. You have to have an innovative culture to try something new—and be prepared to fail."

FIGURE 3

Broadening the Supplier Base

The most respondents say it's the solution for dealing with forecast inaccuracy

Over the past three years, when your organization has had to adapt its supply chain operations in response to an inaccurate forecast, what solutions did it implement? [Select all that apply.]



Base: 327 respondents whose organizations measure the accuracy of demand forecasts.

Source: Harvard Business Review Analytic Services survey, February 2023

Change takes courage. Finding alternative suppliers, bringing on new supply chain partners, entering new markets, or augmenting existing logistics networks with additional facilities means letting go of old ways of working and trying something new. An organization with an innovative culture may find it easier to make such changes.

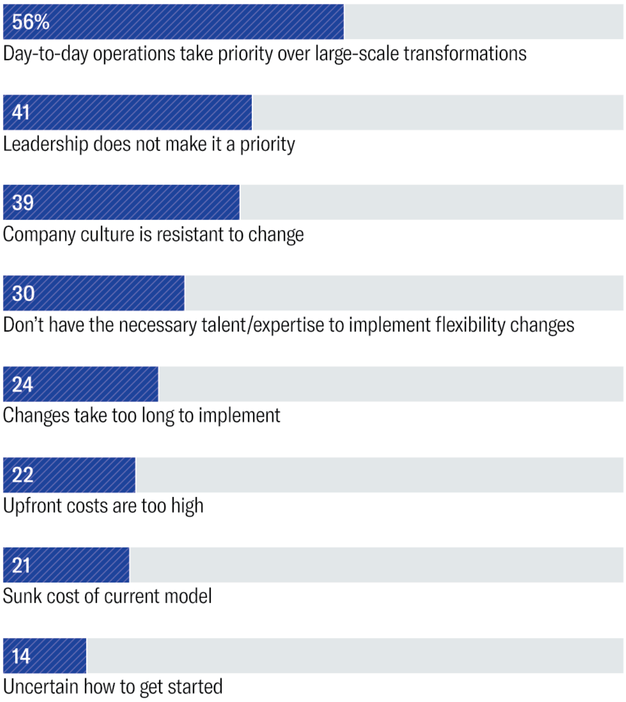
For survey respondents who say their organization is not working to increase flexibility, the greatest obstacles holding them back are more related to cultural and organizational difficulties than to technical or financial hurdles. The top three barriers to increasing flexibility are day-to-day operations taking priority over large-scale transformations (56%), leadership not making it a priority (41%), and the company culture being resistant to change (39%). **FIGURE 4**

FIGURE 4

The Day-to-Day Takes Priority

Hurdles to increased supply chain flexibility include daily operations and change-resistant culture

What significant barriers prevent your organization from increasing the flexibility of its supply chain model? [Select all that apply.]



Base: 100 respondents whose organizations are not increasing flexibility, excluding those selecting "don't know" (11%).

Source: Harvard Business Review Analytic Services survey, February 2023

Ferrari believes that change is dependent on talent, and a new wave of supply chain professionals will likely be the ones who champion change and help companies attain greater flexibility. Companies are facing a talent drain in supply chain expertise, and an influx of digitally savvy professionals with an innovative mindset may be required in order to fill the gap. "I've heard many organizations say that they've had to postpone transformation efforts because they didn't have the talent for it," he says. "The supply chain industry saw a lot of people retire during the pandemic. People with a wealth of institutional knowledge about the global supply chain and its nuances, and in-depth knowledge of their organization's suppliers and procurement, are leaving—or have already left."

Fortunately, new talent is stepping in to pick up the reins. "This generation has grown up in a digital age, and they expect systems, apps, and platforms that can provide solutions. They are the ones prodding at their organizations and asking, 'Why are we doing things this way?' They are challenging the status quo, and that's a good thing," says Ferrari.

Conclusion

Organizations have faced all kinds of disruption—from the Covid-19 pandemic to global supply chain snarls and swift changes in consumer behavior—in recent times. This volatile operating environment looks set to stay. Amid all the uncertainty, companies are finding it difficult to forecast demand to plan procurement, production, logistics, and distribution accordingly.

A new approach could be to not rely so heavily on forecasts but instead plan for several possible future scenarios—and put conditions in place to respond to market changes, disruptions, or opportunities as needed. This approach demands far more flexible supply chains that give companies the option to quickly alter production, switch suppliers, or change distribution strategies.

Building this kind of flexibility requires companies to rethink traditional supply chains and challenge the status quo. But it's worth it. Companies that invest in supply chain flexibility report increased customer satisfaction and faster order fulfillment, among other benefits.

Innovative companies that have managed to increase flexibility across their operations may become the market leaders of the future. "The last time we faced this level of disruption where some companies pulled ahead was during the Great Depression," says Anderson. "Those companies were the ones that were more willing to invest, and they became the leaders for the decades to come. We may witness another reshuffling like that, because it does not appear as if we're going back to the old normal. The trick is to be smart about it, invest in the right things, and be as innovative and flexible as you can."

METHODOLOGY AND PARTICIPANT PROFILE

Harvard Business Review Analytic Services surveyed 459 members of the *Harvard Business Review* audience via an online survey fielded in February 2023. Respondents qualified to complete the survey if their organization has a supply chain (to procure, sell, or distribute hard materials) and they were familiar with the organization's supply chain operations.

Size of Organization

31%
10,000 or more employees

29%
1,000–9,999 employees

8%
500–999 employees

24%
100–499 employees

8%
50-99 employees

Seniority

24%
Executive management/ board members

41%
Senior management

25%
Middle management

10%
Other grades

Key Industry Sectors

28%
Manufacturing

10%
Health care

8%
Technology

All other sectors less than 8% each.

Job Function

17%
General/executive management

12%
Operations/ production/ manufacturing

11%
Logistics/ purchasing/ procurement

11%
Sales/business development/ customer service

All other functions less than 11% each.

Regions

36%
North America

21%
Europe

21%
Asia Pacific

11%
Latin America

10%
Middle East/Africa

Figures may not add up to 100% due to rounding.

Harvard Business Review
ANALYTIC SERVICES

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