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Meeting the challenge

Bob Trebilcock, Editorial Director
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Supply chains have been in the news a lot the last couple of months, and not always for the right reasons. It seems as if the two words most often associated with supply chains these days are broken or failed, and supply chain is used to explain the shortages of everything from toilet paper to rib-eye steaks to personal protection equipment. Pundits question whether Amazon's inability to make good on same-day and next-day deliveries or keep its endless shelves stocked during a pandemic will cost it market share.

I don't think I'm being pollyannaish when I say that given the circumstances, supply chains performed pretty well. At a time when most of the stores in my town were boarded up tight, I was still able to get deliveries of exercise equipment from Dick's Sporting Goods, office supplies from Staples, cheese from my favorite creamery in Oregon and wine from wine.com. Was it next-day or even two-day delivery? Nah. But in all instances, the retailer hit their promised delivery dates, even if they were extended. In my view, they changed the proverbial tire while driving 60 miles an hour on the highway. Give yourselves socially-distant high fives.

If you want an example of a supply chain that met the challenge, look no further than AGCO, one of the world's largest manufacturers of farm equipment and the subject of this month's cover story by Steve Banker and Marisa Brown. AGCO has made risk management a core competency and although it works with suppliers in Wuhan, affected areas in Italy and Brazil, an early-warning risk management tool, along with ears on the ground in China, sounded the alarms in late December. More importantly, the supply chain team listened. Beginning in January, it took steps to protect its supply and keep operating. Those lessons were then applied to Italy and other countries as the pandemic swept across the globe. The AGCO team never missed a beat. Their strategy could be a model for every supply chain.

As you read through the rest of the issue, I hope you'll find that there are other valuable lessons for mitigating risk and finding ways to keep going through difficult times.

Finally, we've updated last year's listing of the supply chain certification programs offered by academic institutions and professional associations in North America. Like last year, we are publishing the full program description as a PDF online. It remains one of the best read articles online year over year.

Last but not least, in June Abe Eshkenazi, the CEO of the Association for Supply Chain Management, and I launched The Rebound, a podcast focused on what supply chain management will look like going forward. I hope you'll listen in from wherever you subscribe to podcasts. As always, I look forward to hearing from you with any comments or suggestions for future stories in *SCMR*.

Bob Trebilcock

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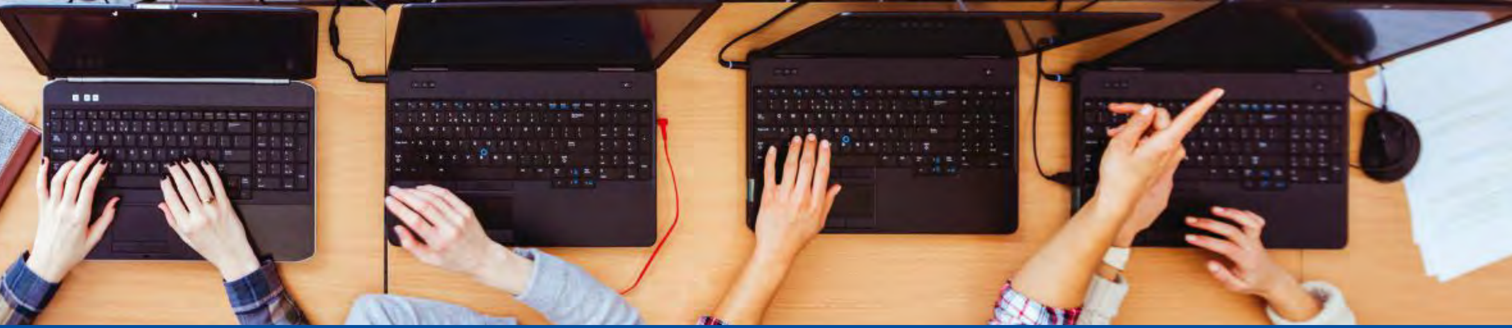

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What about business downturns? Part 2

This Insights column is the second of a two-part series. It deals with lessons learned from selling and surviving in an organization living through the realities of a "bad news" annual budget—and its corresponding forecasts and plans. It is a slight revision of my column, "My year as a corporate Cassandra" (SCMR, May/June 2015). Such as in the first column in the series, the ideas are largely the same, yet are relevant for today's managers because the world is experiencing a drastic economic downturn caused by the COVID-19 pandemic and its ensuing mitigation efforts.

Dr. Lapide is a lecturer at the University of Massachusetts and an MIT Research Affiliate. He has extensive experience in industry, consulting, business research, and academia as well as a broad range of forecasting, planning, and supply chain experiences. He was an industry forecaster for many years, led supply chain consulting projects for clients across a variety of industries, and has researched supply chain and forecasting software as an analyst. He is the recipient of the inaugural Lifetime Achievement in Business Forecasting & Planning Award from the IBF. He welcomes comments on his columns at llapide@mit.edu.

Cassandra suffered from a special curse: She was the Greek prophetess that few believed—sometimes to their detriment. The same can be true for demand forecasters and the sales and operations planning (S&OP) team when it is planning for, or living through, a downturn in business that no one else sees coming or believes is possible. As the steadfast harbingers of bad news, their mettle will be tested as pressures are brought to change their forecasts. In order to survive, it's important for them to remember that they are indeed partners in setting—and helping a company meet—its corporate financial objectives.*

The brunt of these pressures largely falls upon the demand forecasting organization because demand forecasts drive supply plans. When, like Cassandra, one forecasts a significant downward change in business, few will believe it, sales and marketing personnel will deny it could happen, finance will panic about operating margins and executives will have doubts. I know this because I experienced a tough year during my five-year tenure managing the forecasting organization for the field service division of a Fortune 500 computer manufacturer. While assuming the role of corporate Cassandra was stressful, it was actually both my best and worst year in forecasting because it was an important professional developmental year.

This column gives an account of a period that began with the preliminary revenue forecast for the following year's budgeting process. I use it to discuss lessons learned should forecasters and their S&OP partners experience a similar year that often involves surviving an awkward, unsettling and politicized environment.

The best and worst forecasting year

The period was my best because up to that time, my team had a pretty good track record in forecast accuracy—I was in the prime of my forecasting years. It wasn't difficult because of the nature of computer-service revenues, which are largely predicated on the installed base of contracts. Every year, more than 90% of existing contracts renew.**

However, new computer contracts represent a significant portion of revenue growth. This was the aspect that made the period the worst year. Historically, the division had double-digit percentage revenue growth, so this was the expectation that executives initially had in mind for the next year. Indeed, a slowdown in new computer sales in a year with a healthy double-digit service revenue growth was the harbinger of flat revenues on the horizon. Because service revenues don't typically change that much, our executives were skeptical of the forecasts; this was just the beginning of struggles for our forecasting organization. Luckily, because we historically were transparent about the facts, figures and assumptions incorporated in forecasts, our credibility never wavered throughout the budget process that ensued. However, our executives needed to be convinced.

To do so, we spent many weeks working with our finance group delving into greater detail than ever. Our final conclusion was grounded in recent increases in contract back-billing revenue. (A back bill is generated when a piece of contracted equipment retroactively gets put onto a service contract.) The installed revenue base was unchanged because of a slow-down in computer sales that year, yet revenue growth was 15%. The lion's share of that growth was attributed to back-bill revenue, and resulted from a field operations program conducted to make sure that contracts were billing accurately for the equipment that was being serviced. We forecasted that revenue growth would not replicate the following year because the program was complete and back-bill revenues had been written-off as some customers refused to pay the back-bills.

An awkward, unsettling and politicized environment

Once the executives were convinced that revenues would likely be flat the next year, the cost-side of the budgeting process began. In the past, our collaborations with a host of other managers were positive and they were our network of "friends." Unfortunately during the budgetary process, the number of friends in our network dwindled.

Once a flat revenue number was set, everyone recognized that next year's cost budget would shrink and that there would likely be no new hiring, few employees would get salary raises and promotions and layoffs were a possibility. Previously, whenever we bumped into these friends, they would always ask: "How are we doing in revenue?" After giving them the same bad news a few times, they stopped asking. This created an unsettling and uncomfortable working environment for the forecasting group. We had quickly become *personae non gratae*; no one wants to hear from the harbingers of bad news. In addition, company politics reached an unprecedented high as many employees tried to position themselves to prove their worth in order to keep their jobs.

Early the next year an SVP was brought in from outside to run the division. When briefed on the revenue picture, he too was skeptical. The revenue forecast prevailed throughout the year because it turned out to be relatively accurate: Instead of flat growth, revenue actually shrunk by 1%—it may have been unsettling, but we were 99% accurate. During monthly meetings he was routinely disappointed by the fact that none of his fixes was changing the revenue picture. Despite the accuracy of our forecasts, the SVP harbored concerns about me as was pointed out during my annual performance review. Eventually, after the year was almost over, I was vindicated. During an executive briefing, the SVP said: "Larry is the only person in the division who will tell me what he really believes."

Lessons learned

The major forecasting lessons I learned during this stressful year are summarized below.

• ***Do opinion free forecasting.*** Forecasts must be devoid of opinion, especially during a downturn. There is much wishful thinking from others brought into a forecasting process during tough times. Fight the urge to go along with it, and base forecasts solely on the facts, figures and assumptions used as input to your forecasting models. This is important in order to counter naysayers who are of the opinion that the forecasts are not right, for no other reason than they "just aren't." Position the forecast numbers as "innocent until proven guilty." The forecast is incorrect if it can be proven that some of the facts, figures and assumptions are incorrect. If that turns out to be the case, then (and only then) updated forecasts numbers should be generated using the correct data.

• ***Provide an estimate of forecast accuracy.*** Because all forecasts are fraught with unavoidable errors, an estimate of error (such as a confidence range) should accompany forecasts. This is important so that planners can use the estimates to mitigate risks associated with the uncertainties. In addition, it might placate those naysayers whose forecast opinions are consistent with the uncertainties (such as when their opinions fall within the confidence range provided).

• ***Be professional.*** Successful forecasting organizations are those that are the most credible—not necessarily the most accurate. A history of credibility can go a long way toward getting through the most difficult of times. This mostly comes from acting in a professional manner when it comes to your job. Executives need to believe that despite forecast accuracy being erratic and less than they would like to see, the forecast organization provides the greatest accuracy and that no one inside or outside of the company could do a better job. In short, the executive team needs to fully trust the organization and believe, such as the SVP finally believed about me, that the forecasting organization will tell executives what they believe to be true.

• ***Stay out of politics***. A forecasting organization should always be viewed as unbiased, unemotional and having no hidden agendas. Forecasters should always be viewed as "wearing their corporate hats" and not siding with one side or the other when it comes to forecasting. While some political people might appear to thrive for a short period time, these people come and go depending upon which corporate regime is in place. Generally, a "trusted politician" is an oxymoron.

While I learned these lessons as a forecaster, they are also valuable for S&OP planners charged with developing accurate supply-demand plans. Additionally, because planners are partnered with the forecasting organization, they should not be throwing forecasters "under the bus" when the going gets tough. There was not an S&OP team in place during my forecasting tenure, but I wish there had been so that I could have had a team to lean on during my difficult year as a Corporate Cassandra.

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**In "Navigating a course with planning and forecasting," my* Insights *column from the May/June 2014 issue of* SCMR, *I advocated for an unbiased and professionally-run forecasting organization responsible for generating the demand forecasts used by the S&OP team, yet independent from S&OP.*

***See my May/June 2012* Insights *column, "Installed-based supply planning," to read about the method used to accurately forecast service revenues.*

Fresh approaches to omni-channel in the grocery business

By Eva Ponce and Sergio Caballero

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The innovative omni-channel supply chain models that have reshaped many parts of the retail industry continue to evolve in response to market changes. One of these changes is the increasing demand for grocery products ordered online, a trend reinforced by the COVID-19 pandemic that imposed restrictions on the use of physical stores for grocery shopping.

A challenge for traditional grocery retailers is how to develop omni-channel supply chains that support both online and offline buying channels and deliver seamless customer service profitably.

To explore this challenge, researchers at the MIT Center for Transportation & Logistics built a supply chain model as part of a project sponsored by one of the world's largest food retail groups. The model shows that omni-channel can deliver improved performance and reduced costs in the grocery business. The work also highlights further research opportunities.

Lack of integration

Many supermarket chains—including outlets operated by the sponsor company—have created "click and collect" purchase options, where customers place orders for groceries online and collect the products at a brick-and-mortar store on the same day. However, home delivery of online orders is still the most common option in e-commerce.

While these service configurations offer some of the benefits of e-commerce, most retailers manage their offline and online channels separately. To fully exploit the advantages of omni-channel retailing, the channels must be integrated.

The main goal of the research project was to evaluate the impact of supporting the home delivery of online orders for groceries using an integrated distribution network. The work focused on the two key research questions that follow.

1. How can grocery retailers integrate online and offline channels to better serve their customers while remaining cost-efficient?

2. Should the sponsor company use its existing brick-and-mortar facilities to fulfill online orders?

The existing network

The company's current operating model for e-commerce and conventional buying channels is based on a network of DCs, dark stores, warerooms and physical stores. Dark stores are warehouses used to fulfill online orders. Warerooms also serve the online market, but are smaller spaces attached to stores.

The proposed model was developed and tested in Massachusetts where the retailer operates hundreds of stores, four DCs, five warerooms and one dark store. It also serves almost 400 customer demand locations aggregated by zip code.

In its traditional offline business, the company ships product directly from its DCs to brick-and-mortar stores. The fulfillment process for online orders is a little more complicated. The first leg involves shipping product from three DCs to the dark store and warerooms. In the second leg, orders are distributed from the dark store and warerooms to customers.

Total distribution cost is driven mainly by transportation (48%), followed by order handling and facility opening/operating costs (about 26% in each case). Interestingly, in the company's online operation the second leg accounts for about 94% of total costs. This reflects the high cost of the last mile in the retail business.

Research approach

To answer the two research questions listed above, it was necessary to analyze the company's existing brick-and-mortar and e-commerce capabilities. Three key parameters were assessed: customer preferences, the physical flow of goods (including distribution network flows, product flows and inventory) and the service delivery model for fulfilling customer orders.

The model was built to meet several criteria. It should leverage the company's current infrastructure, compare the current distribution network with the omni-channel model and perform scenario planning analyzes to test its robustness. Throughout, there was an emphasis on reducing physical flow costs, and an objective function was created that minimizes transportation, handling and facility opening costs.

Importantly, the option of closing existing DCs and physical stores was not available when developing the new omni-channel model. Also, certain constraints pertaining to supply capacity and the capacity to meet demand at each node were added to the model, which also had to ensure conservation of flow throughout the network.

Cost-cutting alternative

Using the methodology described, the company's online distribution network was optimized based on the assumption that e-commerce demand remains unchanged.

The new network design retains the three existing DCs but replaces the company's warerooms and dark store with six new warerooms in different locations. This reconfiguration was driven largely by transportation costs that are highly dependent on the distance and locations of the various facilities in relation to the retailer's DCs and customers.

The overall cost profile of the proposed network is similar to the existing one. Transportation costs account for the largest portion (approximately 39%), followed by order handling and facility opening/operating costs (about 35% and 26% respectively). However, adopting the proposed omni-channel distribution network would enable the company to capture around $15.7 million in cost savings—a 22% reduction. Most of the savings derive from transportation in the second leg.

Market testing the model

Scenario analysis was used to test the feasibility and robustness of the model. The scenarios also provide insights into how the company's integrated omni-channel operation might perform under different market conditions.

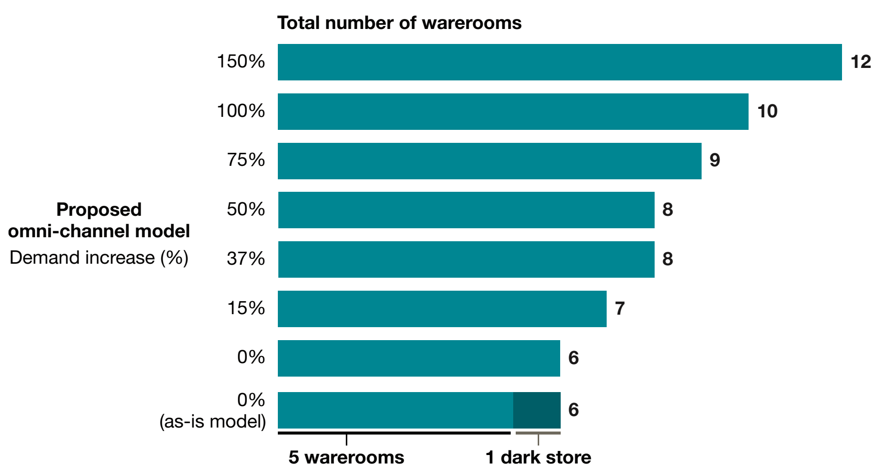
Scenario 1. The first scenario involved a break-even analysis that indicates the amount customer demand would have to increase to make the new network's costs equivalent to those of the existing network. The analysis showed that the company can grow demand by 37% without incurring additional costs relative to its current operations—an indicator that the model is cost-effective.

Scenarios 2 and 3. These scenarios explored the impact of expected 15% and unexpected 50% demand increases on the proposed omni-channel network. The former scenario aligns with possible market trends; the latter is indicative of a sudden surge in demand caused by an unforeseen event such as the COVID-19 pandemic. The analyzes show that in both scenarios the proposed network can adjust to the new demand levels, affirming the model's flexibility and robustness.

In addition, a scenario planning exercise was carried out to assess the impact of rising demand for online orders on the number of warerooms attached to existing stores that would need to be opened. A notable result is that wareroom numbers do not increase proportionally with demand (see Figure 1). For example, when demand doubles the number of required facilities increases from six to 10, a 67% increase. This is another indicator that the proposed network is robust and capable of absorbing rising demand levels.

FIGURE 1

As demand increases, so does the total number of warerooms required for order fulfillment



Source: Authors

Another noteworthy observation is that when developing solutions in response to different demand scenarios, the model usually favored more warerooms as opposed to dark rooms—even though the latter generally offer lower handling costs. This insight suggests that supporting multiple smaller facilities such as warerooms closer to customers performs better than supporting a large warehouse such as a dark store.

Omni-channel-led changes

It appears that if the retailer adopts the proposed omni-channel network, it will achieve substantial cost savings, enabling it to increase profitability while fulfilling growing demand from its online customers. Importantly, the new configuration integrates the retailer's online and offline channels by leveraging existing facilities. And the model is capable of coping with rising demand for groceries from online customers—even when caused by large-scale, unanticipated disruptions.

However, the findings are not conclusive, and further research is recommended in the following areas:

- investigate different demand patterns and the time required to establish new warerooms;
- explore the environmental impact of the proposed omni-channel network;
- analyze the economic and environmental impacts of offering different channels and hybrid formats beyond home delivery, such as click & collect service options; and
- explore the scalability and replicability of the proposed model in other states and regions of the United States.

Retailers that redesign their omni-channel grocery distribution networks could reap substantial rewards. Many of the consumers who have turned to omni-channel delivery models during the COVID-19 pandemic are expected to continue using these services after the crisis is over. This behavioral shift could help transform the grocery business as it has done in other areas of retailing.

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This article describes research carried out for a capstone research project in the MIT Supply Chain Management Master's Program (SCM). Sergio Caballero and Eva Ponce are project advisors. The research was carried out and authored by Wassim Aouad and Nikhil Ganapathi. They can be contacted at waaou@alum.mit.edu and nikhil_ganapathi@alum.mit.edu

The new normal will require a new strategic approach to the circular economy

The time is right for a purpose-driven supply chain.

By Jan Steenberg and Rakesh Sharma

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On August 10, 2019, the influential Business Roundtable announced something that sounded like it could have been issued by the Vatican: Maximizing profits for shareholders should no longer be the only objective of corporations. Instead, corporations should be managed with a purpose to improve the future of our environment, citizens, employees and other business partners. Take it one step further, and corporations should no longer look at business, the environment or society as separate entities with varying degrees of importance—on the contrary the new thinking should focus on all three areas in an integrated manner, as the parts of an organization's overall strategic and supply chain objectives:

- delivering value to our customers;
- investing in our employees;
- dealing fairly and ethically with our suppliers;
- supporting the communities in which we work; and
- generating long-term value for shareholders, who provide the capital that allows companies to invest, grow and innovate.

Think of it as the purpose-driven supply chain.

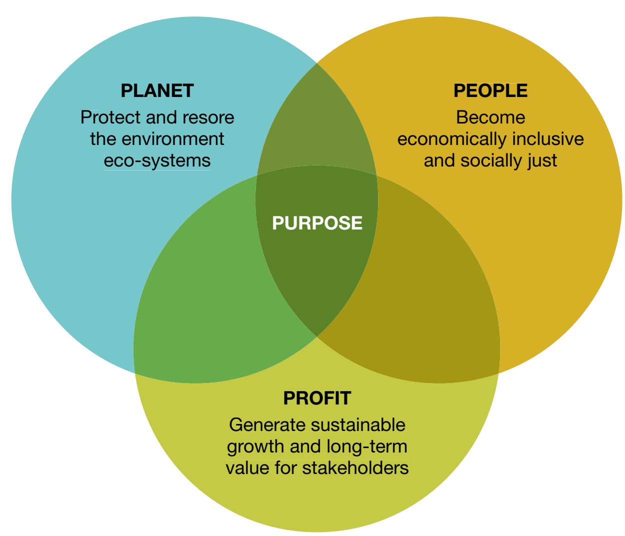
Purpose must consider all dimensions

When the statement was issued, the Wall Street Journal took exception in an editorial, and surely, somewhere Milton Friedman is turning in his grave. But, in the current environment, there is clearly something afoot that business needs to pay attention to with more than lip service.

While most companies believe that corporate social responsibility (CSR) should be a strategic initiative, the majority have not fully institutionalized it and are very cautious

FIGURE 1

Integrated strategic and supply chain objectives



Source: Business Roundtable, "Statement on the Purpose of a Corporation" about adopting a comprehensive program. However, the innovators and early adopters of the CSR framework have transformed beyond this framework and have accepted the Business Roundtable's suggestion for a new purpose-driven ethical enterprise supply network (PDE2SN) approach to their business model.

So, how will this newfound purpose directly affect the way corporations operate their businesses and supply chains? Is this yet another fad to draw in Millennials who are put off by capitalism and are demanding that the corporations, including those they work for, play their part in solving social issues, such as global warming and the widening gap between the super-wealthy and the working poor? Or, is this a genuine commitment to improve the ecosystem in which we all live, work and operate?

What does the purpose-driven supply chain look like?

Companies require a framework that embodies the full range of CSR, sustainability and ethical enterprise supply network (ESN) management principles as part of an integrated approach. Some of the high-level dimensions of a PDE2SN are as follows.

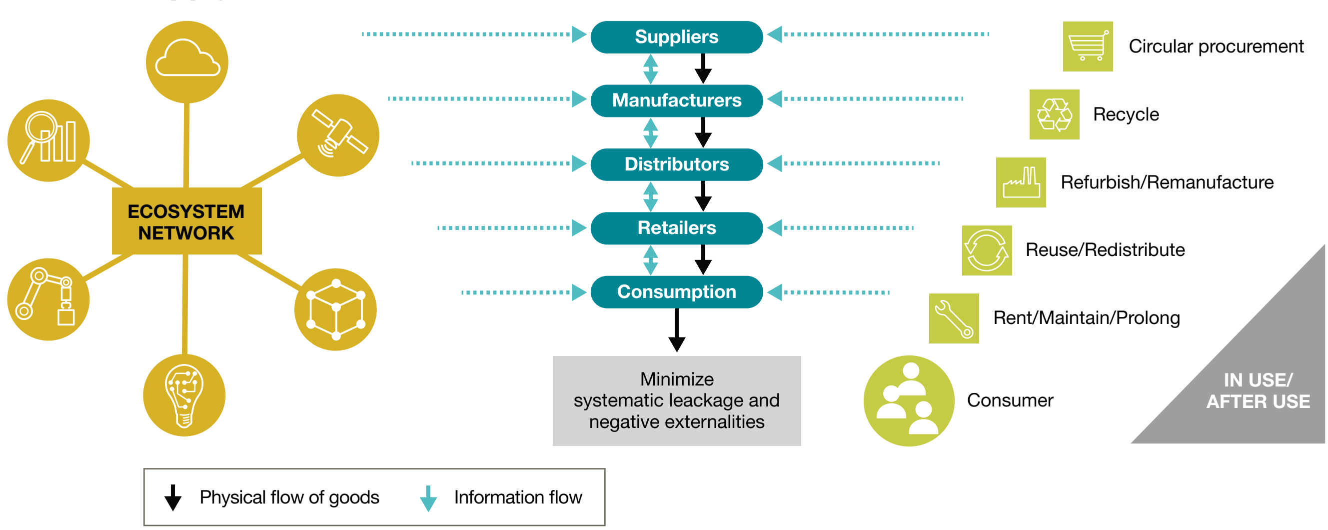
- PDE2SN is comprised of ethical business practices, corporate social responsibility, performance management, sustainability, regulatory compliance and risk management-including financial, operations and brand.
- PDE2SN is not just the component, it is the driver for strategic sourcing and procurement practices. Implementing a Supply Network Collaboration system that provides Cloud-based connectivity with suppliers for registering, operating and managing to the company's purpose and standards is table stakes for the emergence of Ecosystem Commerce.
- Supply Network Collaboration and PDE2SN begin with onboarding suppliers and continuously monitoring, auditing and improving operational compliance and information sharing across three dimensions: economic, environmental and ethical.
- Social media (SOME) monitoring is a critical component of PDE2SN ethical and risk management.

Operating in a circular economy

This trend of organizing business around a purpose is a very strong driver of transformation. We

FIGURE 2

Circular supply network



Source: Authors, adapted from Ellen Macarthur Foundation believe this will only accelerate as firms seek to understand what is most critical for them and what are their true sources of value.

An important aspect that we would also like to focus on is the Circular Supply Network, which assumes an important aspect of the purpose-driven approach. So, what exactly is a Circular Supply Network? It is a network enabling the flow of goods and services between value partners to meet consumer demands while minimizing waste and continual use of resources through smarter business models.

Efficiency in the way we use and restore earth's resources. We take resources from the ground to make products, which we use, and, when we no longer want them, we throw them away: It's a take-make-waste model. This is what a linear economy looks like. However, there are only so many resources to be taken.

A sustainable supply chain transforms a linear economy to a circular one by keeping products and materials in use. For example, returning packaging to be re-used again so it does not end up in a landfill; and, reducing the usage of water and pesticides in growing of crops. Lastly, regenerating the natural systems by returning valuable nutrients to the soil and other ecosystems.

Cost-reduction in the way we design products that last longer, thus eliminating costs in producing, stocking, shipping, returning, disposing and recycling. Consumerism, or materialism, is the backbone on which most industries make their money. When we start consuming less, our carbon footprint is inevitably reduced.

Instead of trying to improve our supply chain to ship more, faster and cheaper to consumers, corporations should place their focus on designing a product to last. By transforming their business models from volume to quality production, environmental costs and waste are reduced. In the absence of purpose, companies are constantly competing with one another in pushing out newer or enhanced models at the shortest time possible, leading to poorer quality, shorter product lifecycles, greater costs and increasing waste.

Improving customer satisfaction

Corporations should treat corporate social responsibility and ethical supply chain management as an integral part of their operations strategy in line with consumers' wishes.

To truly contribute to a better world, corporations need to treat sustainability as integral to operations. Sustainability issues should be considered with equal strategic importance as issues such as delivery lead time. Instead of taking modest actions to treat sustainability issues, corporations can seek more holistic and structural approaches to do more good, rather than just doing less bad.

The new normal

The truth is that more and more people are judging large corporations, not by how fast they can deliver products to our homes, but by how sincere they are in doing good. Doing good comes from a company's ethical commitment to solve major social, environmental and economic issues. Sincerity arises when a company invests in a PDE2SN strategy and commits to measure success with more purposeful strategic metrics. PDE2SN is a true driver of how supply chain organizations will guide themselves above and beyond the pursuit of profits. Those who are not will be driven by their customers as the market will insist on the transformation of business objectives away from maximizing profits to creating value to the market ecosystem and the communities it serves.

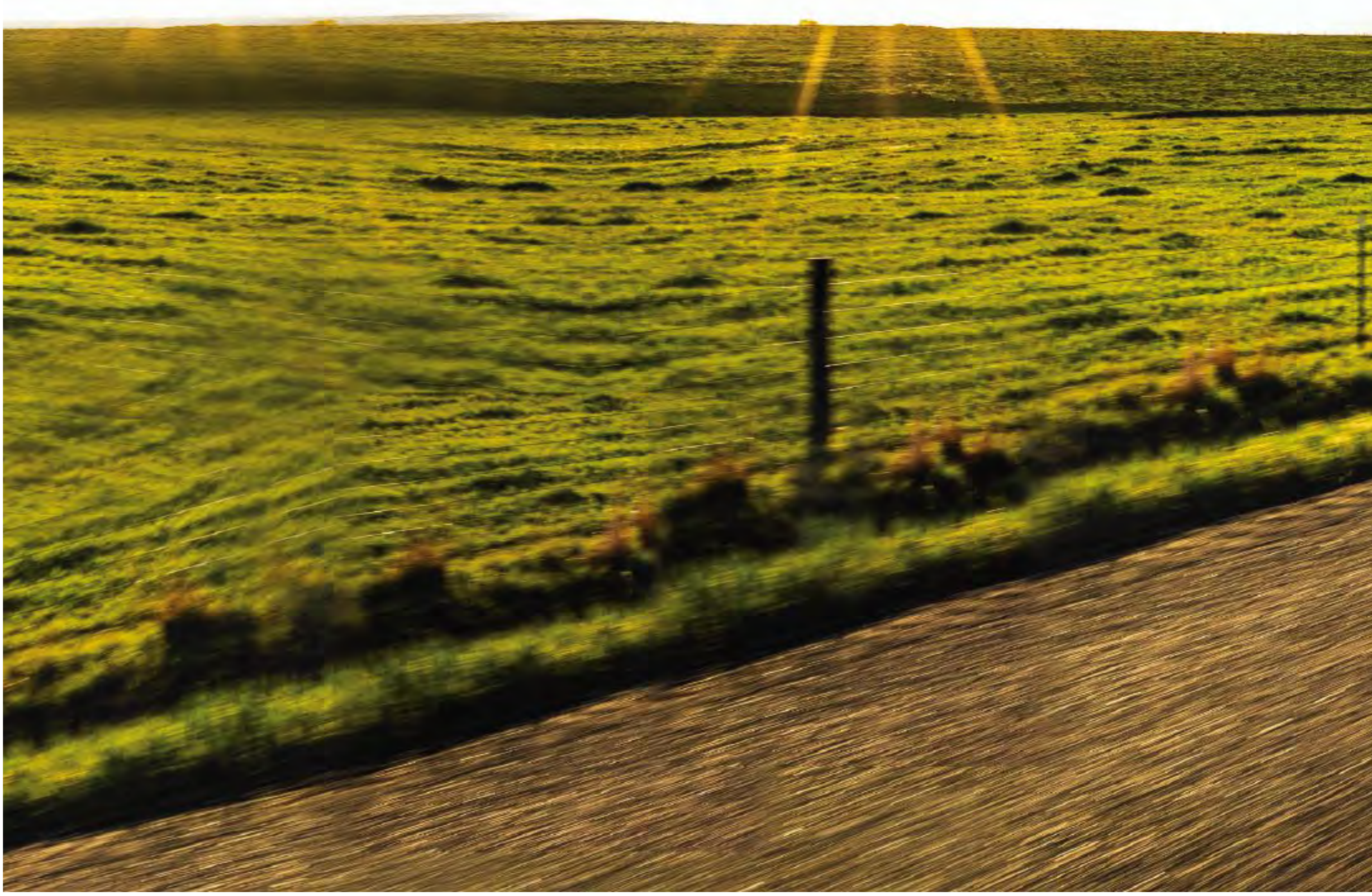
To learn more, read "The ethical supply chain," scmr.com/article/the_ethical_supply_chain, which is based on research by the Association for Supply Chain Management and Supply Chain Management Review.

How They Did it: AGCO and COVID-19

When COVID-19 was bringing other supply chains to a screeching halt, AGCO acted early and decisively to keep its operations around the world up and running. The key: A very agile supply chain.

BY STEVE BANKER, MARISA BROWN, AND GREG TOORNMAN

In January 2019, a time when COVID-19 was barely on most companies' radar, the supply chain team at AGCO, a leading manufacturer of agricultural equipment and replacement parts, began to hear from employees in China that something was happening in Wuhan, something that could put the supply of critical parts at risk.



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While many global supply chains failed to hear, or heed, similar warnings, AGCO's antenna was up. The company had been focusing on risk management and resiliency for more than 15 years. Procurement leaders were not just measured on cost savings, but also on supplier risk management. Regular communication with suppliers was part of the job description. And, the company had digital tools in place to track events in its supply chain, including a risk notification and visualization tool and an e-sourcing platform. The result is a nimble and agile supply chain that was able to quickly develop alternate sources of supply, turn to alternate transportation modes and source and deliver critical personal protection equipment that allowed suppliers in affected areas to remain in production.

This is the story of how AGCO developed resilience and agility in its procurement organization. More importantly, it takes place in the context of the state of supply chain risk management and resilience. That context is provided by important research and analysis from the Boston consultancy firm ARC Advisory Group and APQC, a member-based nonprofit organization focused on benchmarking, best practices, performance improvement and knowledge management. APQC data is so valuable because of the large pool of 500 members that it draws from, and because of the rigorous process it goes through to vet its results. In short, this data is far more accurate than much of the best practice survey data the supply chain industry otherwise relies upon.

Sourcing risk management best practices

We are in the midst of a digital revolution—unfortunately, according to survey results, the revolution is more rhetorical than real. If the current pandemic has taught the supply chain profession anything, it's that companies should be doing more multi-sourcing. Further, risk management needs to be an integral part of the sourcing process.

That is one of the takeaways from APQC's benchmarking data. Another is that the process of achieving the robust capabilities illustrated by AGCO is lengthy and difficult for most organizations to achieve.

Before looking at AGCO, we need to answer the question: What are the best practices surrounding procurement risk management? Based on APQC's survey results, they are as follows.

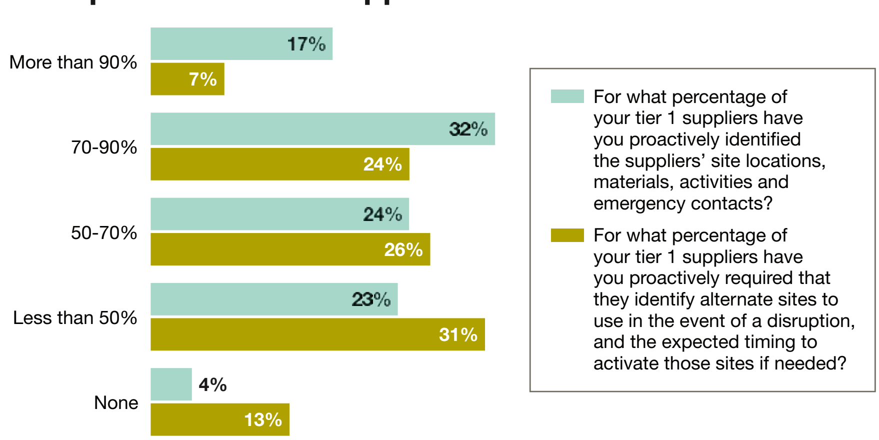
- Identify where your suppliers, second tier suppliers and even third tier suppliers are located. Understand how inbound materials and outbound products flow and identify potential choke points.
- Monitor and measure your situation via close communication with vendors and suppliers. Focus on building and maintaining collaborative, strong relationships that help both parties be successful.
- Identify and qualify alternate suppliers. Ensure you have alternate sources of supply that can ramp up to the volume needed and that you know the activation time required.

We believe that these are entirely logical best practices that few sourcing professionals would argue with, particularly in lieu of the global pandemic. And yet, in APQC surveys, many companies report that they have made relatively little progress in putting these strategies into practice.

Many organizations are doing an adequate job of identifying their tier 1 suppliers' locations, materials, activities and emergency contacts. Forty-nine percent have identified this for 70% or more of their tier 1 suppliers. At the same time, only 31% of those surveyed have required that 70% or more of their tier 1 suppliers identify alternate sites to use in the event of a disruption and with activation timelines. Clearly, there is much room for improvement in this area.

FIGURE 1

Disruption and tier 1 suppliers



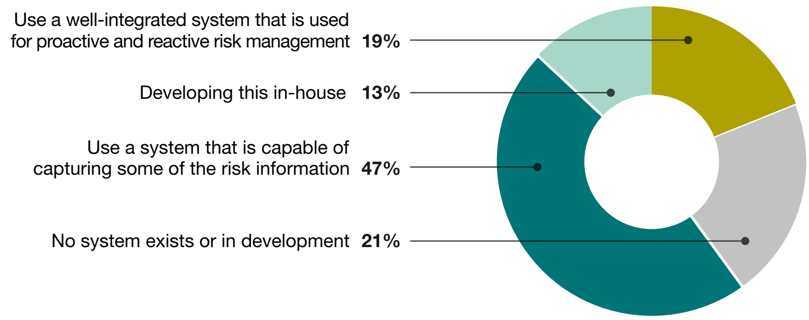
Source: APQC

Disruption and tier 1 suppliers

In the event of a potential or existing disruption, it is important to know where key suppliers are located and have the right contacts and escalation processes in place. But it is even better if the disruption does not occur in the first place. Suppliers that have business continuity plans in place are better partners. But ensuring that those plans exist is the responsibility of the buyer. Only 21% of companies have the most mature processes in place for collecting and reviewing suppliers' business continuity plans; 44% of organizations have no process to collect and review business continuity plans (BCPs).

FIGURE 3

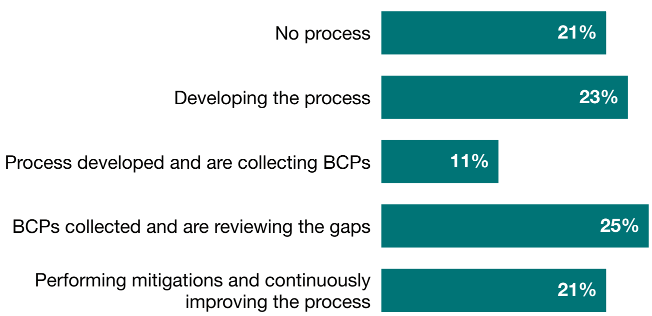
Are companies using a well-integrated system for risk management?



Source: APQC

FIGURE 2

Maturity of process to collect and review business continuity plans



Source: APQC

The degree to which companies engage in multi-sourcing depends in part on the risks associated with working with their suppliers. One-third of respondents are not yet using an electronic system that provides a risk profile of their suppliers, materials, supplier manufacturing sites, categories and products. This gap can leave organizations vulnerable and slower to react to unforeseen disruptions and supply chain risks. Only 19% of respondents report that they work at a company with a well-integrated system for risk management.

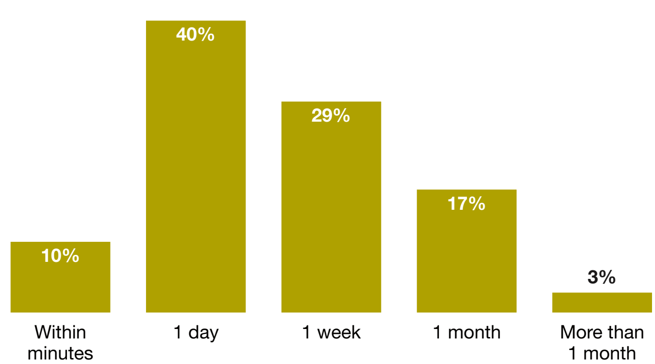
APQC also asked respondents whether they were using a system for continuously monitoring global supply chain disruptions. Thirty percent of companies had no system for monitoring disruptions. An additional 33% had a system, but it did not provide information on the potential impact to their company.

When it comes to supply chain disruptions, knowing sooner is better. Advance warnings like those received by AGCO not only provide better mitigation, they can provide a competitive advantage. When it came to the time needed to identify affected materials, sites, commodities and products after a disruption, half of the companies participating in the benchmarking replied that they would know this within one day.

Getting robust visibility to existing and probable disruptions requires digital technologies. Some of these technologies provide much better advance warning than others. There a few providers of supply chain risk solutions that have mapped their customers' supply chains. These maps include not just supplier

FIGURE 4

Time to identify affected materials, sites, commodities and products after an event disrupts the supply chain



Source: APQC

locations, but how inbound and outbound materials flow through ports and other potential choke points. Then, these solutions monitor hundreds of thousands of online news sites, as well as social media, across multiple languages.

So, for example, a Chinese news site was the first to report that there were explosions at the port in Tianjin, China on August 12, 2015. The advanced digital risk solutions were able to tell their clients about this immediately, as well as telling them which of their inbound supplies from which partners flowed through this port. The companies that knew first were able to reroute their shipments to alternative ports. Those companies that learned even a couple of days later had to resort to much more expensive alternative modes of transportation.

Engaging in multi-sourcing?

Sometimes the ability to find alternative sources of supply can happen very quickly. Data from Descartes Datamyne shows that after 25% tariffs were imposed in January 2019 on Chinese pneumatic tires made of rubber—car tires—China lost 65% of its U.S. tire import volume in 15 months. That's nearly 13,000 shipping containers—twenty-foot equivalent unit (TEUs). China went from being the second largest exporter to the United States for this item to the fourth largest.

Like AGCO, Bob's Discount Furniture was an organization that kept an eye on news that might affect its off-shore suppliers. As tariffs on furniture began to take hold at the beginning of 2019, the retailer shifted 25% to 30% of its sourcing out of China in just three to four months. How was sourcing able to shift so quickly? Plants in other nations were already able to produce these products. Clearly, there also had to be excess capacity or the ability of existing manufacturers to quickly scale capacity.

Identifying potential new vendors is much easier if companies are using the right digital tools. Database tools that can access extensive import/export data make it easier to identify the largest set of potential suppliers, which suppliers a company's competitors are using and even, in some instances, what the competitors are paying their suppliers for the products they are purchasing.

But in other instances, the ability to switch suppliers, and build an alternative supply chain, can take time. In March of 2011, a tsunami triggered the Fukushima Daiichi nuclear disaster in Japan. The Renesas Electronics plant in the tsunami-affected part of Japan made up 40% of the world's supply of microcontrollers used to control a car's engine by automotive manufacturers. There are instances where companies have flexibility—where they can divert parts from one plant to another or look to get substitute parts from other suppliers—and instances like this where flexibility just does not exist because there are a limited number of suppliers or production points. Companies dislike holding "just-in-case" inventory, but sometimes it's necessary.

The tsunami/nuclear disaster caused several automotive OEMs to look closely at their sourcing and risk management practices. General Motors learned that business continuity plans at its plants were too "tactical." Six weeks after the disaster, GM was still finding suppliers located within the affected area. Supply chain risk management subsequently became strategic at GM, with the CEO meeting regularly with the strategic risk department. GM has worked to inculcate risk-based thinking not just internally, but among its suppliers.

For many types of critical components, it can be a long journey to qualify vendors and then get them to the desired state of product quality, delivery performance, upside responsiveness, corporate responsibility and risk management capabilities. For custom-engineered supplier components, a manufacturer is doing well if a new vendor is performing satisfactorily after a year of collaborating with them closely.

AGCO: Resiliency during a pandemic

AGCO is an example of a company that has made risk management and resiliency a core competency. From the middle of January 2020 through the end of March 2020, a time when many global supply chains were devastated, AGCO continued to receive supply, maintained production and satisfied its customers.

This is how they did it.

With more than $9 billion in annual revenue, AGCO is one of the world's largest manufacturers of agricultural equipment and replacement parts. Its products are marketed under several well-known brands including Challenger, Fendt, GSI, Massey Ferguson and Valtra. The AGCO global supply chain includes 41 manufacturing and assembly locations, 37 distribution facilities and thousands of suppliers located around the world—including hard hit areas like China, Italy and Brazil.

Agricultural equipment manufacturers have certain advantages that other multinational manufacturers do not. Regardless of business conditions—or even a pandemic—the world needs farmers to continue to plant and harvest crops. As such, companies like AGCO are what the United States calls "federally designated essential critical infrastructure businesses." That ungainly phrase means these companies are critical and can stay open if they can demonstrate and maintain safe working conditions for their employees.

The other advantage agricultural equipment manufacturers have is that despite the recession, demand for their products remains high. For AGCO, there are plants that have order banks extending many months. Further, the need for spare parts never goes away.

The supply side of AGCO's global organization talks at least once each week. The global leadership team (global and regional) and front-line reporting employees in each region align on activities, supply escalation, initiative implementation and performance. They have been doing this for eight years. They discuss what they are hearing from suppliers and customers.

In mid-January, when the supply chain organization began to hear about what we now call COVID-19, the company did what it normally does around operational problems, conduct a risk assessment. Employees in China began talking to the supply team about what was happening and what they expected might happen. The company explored sourcing options and alternatives. But things got worse. By the third week of January, AGCO had put together a task force for managing the crisis. The team started having calls with the headquarters in Duluth, Georgia twice a week. Plant managers, materials and logistics managers, purchasing, supplier quality and finance all participated in the sessions. Questions included: What is our capability to get critical supplies from suppliers outside of China? What is our capability to ship needed components to our plants in Europe? When does it look like things will open up again?

As China was preparing to shut down, the task force began to prepare for when the restrictions would end and China would be authorized to return to work. The team assessed whether their plants had enough personal protective equipment (PPE) to operate, and whether Chinese suppliers had enough PPEs. They started amassing PPEs in Chicago. That important inventory was distributed to AGCO's critical suppliers on the condition that they would work on AGCO orders before any of their other customers.

The mass buying started in January and has continued through the crisis. Initially, PPEs were purchased in Europe, North America and South America and then moved to China. As China began to resume production, the pandemic spread and threatened production in other regions, such as Italy for instance. AGCO's sourcing team began buying PPE from China and moving the product to the Americas and Europe.

To make sure European plants stayed supplied with components, AGCO focused on producing as many of the critical components as possible. They then shipped them by train across Russia rather than using the longer transit time but less expensive ocean mode of transport. AGCO payed 85% more than sea freight based on shipping via rail, but 90% less than air freight. Most importantly, sites in Europe felt no impact from the China industrial shutdown.

AGCO's material planning team in China oversaw the Chinese supplier recovery and global shipping on behalf of AGCO plants across all regions. Partly, this was because of time difference and because the local AGCO staff spoke Mandarin. But they also wanted centralized decision-making on where to send the shipments. They didn't want the different plants fighting each other for supply. Central allocation decisions were made—factories with higher gross margins got a higher allocation—and the China staff enforced those decisions.

On February 10, Chinese factories outside of Wuhan started opening after a two-week shutdown if the plants could demonstrate and maintain a safe working environment. The stringent safety rules were then put in place at all AGCO facilities across the world.

At first, plants in China with social distancing and other restrictions in place were unable to achieve full productivity. But tach times were adjusted, workers stepped up and productivity surged. That first week, the company shipped 10 containers out of China rather than the normal 75. By February 24th, the third week back, AGCO was back up to 75+ containers per week. By the first week of March, 105 containers were shipped.

AGCO: Predicting risk

AGCO has a risk notification and visualization solution from riskmethods. This solution has a graphical view of the AGCO supply chain across multiple supplier tiers. This tool became a critical success factor during the pandemic. Utilizing it, AGCO was able to predict the South Korean shutdown days before it occurred and accelerate the affected suppliers' shipments out of that nation prior to plant closures.

The ability to predict when shutdowns would occur improved over time. In forecasting lockdowns, the risk management team looked at infections per million people (ppm) per country. They realized that once infections got to between 50 ppm and 60 ppm, governments began to act. By 100 infections ppm, restrictions were in place. Utilizing that measure, the company was able to predict the Italian shutdown seven days before it occurred.

That was important, since AGCO has 240 suppliers in Italy. More than 180 were located in the high-risk zone in Northern Italy. The seven working days lead time allowed the company to pull shipments out in front of the lockdown. This was done surgically. For example, a supplier in one postal code had a higher priority than one 50 kilometers to the west. The shutdown forecast also allowed the company to position extra PPEs at its three Italian facilities. Then, the company worked with its Italian lawyers to get a special industry designation that allowed the suppliers to continue working legally. The lawyers got those documents quickly and then distributed them to all employees and suppliers in 24 hours. This allowed key suppliers to keep operating for another two weeks after many of the companies in the affected were shutdown.

By March, the company had been affected by incremental, country-by-country shutdowns across Europe. The ability to forecast worsening conditions in nations allowed AGCO to forecast lockdowns in Switzerland, Spain and Sweden ahead of time, and follow the same game plan that it had executed at locations in affected regions of Italy.

Supply chain resilience at AGCO didn't just happen by chance; the capabilities were developed over time. In 2004, the company began a transformation of its sourcing organization. Then, AGCO moved from a fragmented and decentralized approach to procurement to a centralized commodity management structure in order to balance buying synergies with an increased focus on risk management. Implementation of standardized roles and responsibilities, and global policies and procedures, were supported by an extensive change management program. The company formed a "School of Purchasing" to further develop the capabilities of the organization.

The risks associated with sourcing became part of each category manager's job; these managers became responsible for supplier risk management, and not just savings. For AGCO, a "best cost sourcing strategy" includes multi-sourcing. A certain percentage of components are produced locally and a certain percentage—depending on the brand and its go-to-market strategy—comes from companies in best-cost countries. The percentage of goods sourced locally changes based on exchange rates, tariffs, the volume of goods needed and other considerations. But the company almost always has domestic sources for the components that go into the agricultural equipment produced in that region. Local companies can respond more quickly when something goes wrong.

Back in 2008, the company realized it needed to teach buyers that sourcing is about more than costs. AGCO needed a risk factor included in the buying decision. Sourcing staff needed to factor in the answer to the questions: "If something goes wrong, what is the cost to remedy that situation? And: "If quality is bad, how fast can AGCO respond?" It's difficult to teach that because most people like to plan as if things will proceed normally.

Starting in 2012, AGCO digitized its sourcing operation, implementing an e-sourcing platform from Synertrade. This platform automatically captures material costs, overhead rates, labor costs, duties, inventory carrying costs and packaging costs. These costs determine the total cost of ownership, or TCO. The buyer does not need to ask anyone for any of these costs, they can see the full costs in an apples-to-apples, supplier-to-supplier, comparison. The platform also includes an analysis of whether the cost of failure is low, medium or high. Higher risk materials pay a penalty that is reflected in the total cost of ownership.

Material planners are expected to communicate regularly with suppliers to learn what is happening in their operations; for example, whether a plant learns a shipment might be delayed beforehand rather than after it has not shipped on time. AGCO speaks of a "relationship ratio" that reflects how often material planners and their suppliers are talking. They see a significant difference if a material planner at a plant must communicate with 35 suppliers versus a material planner working with 55 suppliers.

AGCO's journey to build a supply network that was adaptable, digital and standardized took years, but it has not ended. If anything, following the pandemic, AGCO remains more committed to continuous improvement.

Integrating risk management

It is commonly thought that improving a process involves a combination of people, process and technology. This is most certainly true of sourcing risk management. Too many companies have prioritized low-cost sourcing at the expense of a more robust process that integrates risk management. The pandemic will be a wake-up call. Unfortunately, in terms of responding to the present crisis, companies are shutting the barn door after the horses have bolted.

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[I] *Often to get a sufficient number of respondents, surveys offer a reward to fill out the questionnaire. This can lead to respondents providing inaccurate information to become eligible for the reward.*

[II] *ARC Advisory Groups global market study on Supply Chain Collaboration Networks identified the two largest suppliers of this class of risk management as riskmethods and resilinc.*

[III] *Descartes Datamyne has a comprehensive, searchable database of import-export information covering more than 75% of the world's import-export trade. Descartes did a custom analysis of this issue at the authors request in April, 2020.*

[IV] *Steve Banker, "There Can Be Great Challenges in Finding Alternatives to Trading with China," Forbes.com, November 19th, 2019*

[V] *The Descartes Datamyne is an example of one such solution.*

[VI] *"Getting by With a Disrupted Supply," Online article from Tuck School of Business at Dartmouth College based on an interview with Assistant Professor Brian Tomlin.*

[VII] *Steve Banker, "General Motors' Approach to Supply Chain Resiliency," Logistics Viewpoints, May 9th, 2016.*

Supply chain management is NOT ENOUGH

Is shared supply chain leadership the future?

BY CRAIG L. PEARCE AND CHRISTINA L. WASSENAAR

Supply chain management is, at best, an insufficient idea when it comes to optimizing supply chain performance. "Management" implies that one party has dominion over the other, which is not the correct perspective for establishing long-term, effective relationships. We can shift this thinking by moving to a perspective on supply chain *leadership*, but again this puts one party squarely above the other. This too is an inadequate shift if we are to build strong relationships, which is the ultimate goal in supply chains. What we need to do instead is leapfrog from supply chain management to the vanguard approach of *shared supply chain leadership*. Shared supply chain leadership means a true sharing of the leadership of the relationships of the supply chain partners, whether they be internal organizational partners or partners across firm boundaries.

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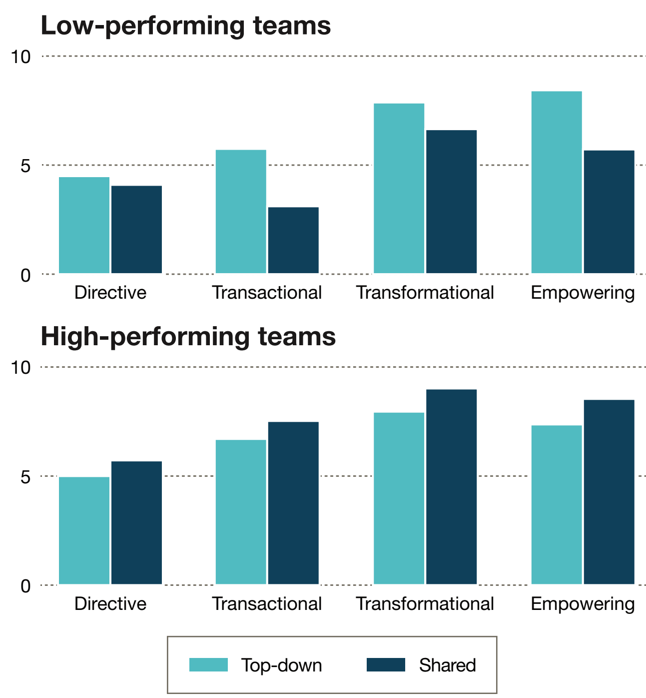
What is shared leadership? Shared leadership entails the informal, serial emergence of multiple leaders, depending on the knowledge, skills and abilities of the individuals involved, while considering the emerging requirements of the tasks facing those parties, as they unfold over time. Whereas traditional approaches to leadership emphasize formal roles and top-down influence, shared leadership emphasizes informal roles and dynamic emergence of influence from multiple individuals. Leadership, after all, is centered on the importance of influence—and nearly every single person is capable of influencing others. The key here, however, is unlocking this potential for influence in organizationally appropriate manners.

Shared leadership is not to be confused with laissez-faire leadership—which is simply abdication of responsibility by a formal leader. Rather, the role of the formal leader becomes even more crucial when he or she attempts to implement a shared leadership approach. In fact, research documents that low-performing teams are dominated by formal team leaders, while the highest performing teams display more shared leadership from team members than leadership from a formally appointed leader. But the story is a bit more nuanced: Research also shows that all members of high-performing teams—including the team leader—engage in more leadership influence than their counterparts in low-performing teams. The key distinction here, however, is that in the highest performing teams the formal leaders do not engage in a disproportionate amount of influence relative to other team members. Rather, they share the lead across the team, and the results speak for themselves.

What is the upshot? Poor performing teams are dominated by team leaders, effectively stifling the collective intelligence of the team. Generally, such leaders have very weak egos and are afraid that they might be out-shined by someone, so they engage in domination of others. High-performing teams exhibit much more egalitarian leadership practices, where the leadership rotates rather fluidly to the person with the most expertise for any given issue—high-performing teams simply display far more leadership across all members. See Figure 1 for a graphic display of the leadership profiles of low- versus high-performing teams.

FIGURE 1

Leadership profiles of low-and high-performing teams



Source: Adapted from Pearce, C.L. & Sims, H.P. Vertical Versus Shared Leadership as Predictors of the Effectiveness of Change Management Teams

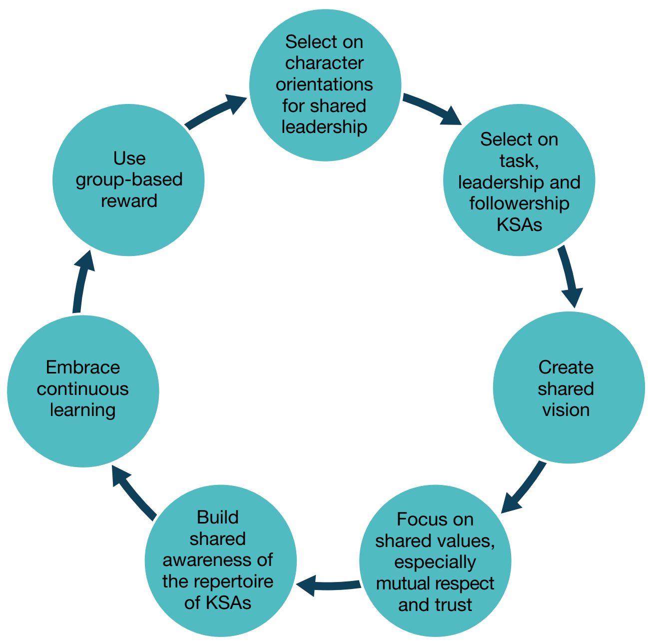
Figure 1 depicts four types of leadership behavior—directive, transactional, transformational and empowering—emanating from two different sources of leadership—hierarchically appointed formal leaders and team members, where the higher the respective bars on the graph indicate greater engagement in that type of leadership behavior. The black columns indicate the amount of leadership displayed by formal leaders and the gray columns indicate the amount of shared leadership displayed by team members.

Evident from the graphs is that in low-performing teams leadership is *centralized*, where formal leaders engage in more overall leadership behavior than do the team members, while in the high-performing teams the leadership is more dispersed, where team members engage in more overall leadership behavior than do formal leaders. A closer inspection, however, reveals that in the high-performing teams both sources of leadership (formal leaders and team members) engage in more overall leadership behavior. High-performing teams simply engage in more leadership, no matter what the source of the leadership: It is not a binary choice between top-down and shared leadership—both are critical.

Beyond the graph in Figure 1, shared leadership has been clearly documented to result in superior outcomes across a wide variety of types of organizations, from hi-tech to low-tech, from the Americas, to Europe, Asia, Africa and the Middle East. In fact, shared leadership is a much better predictor of organizational outcomes than formal, hierarchical leadership. This even holds true at the very highest levels of organization: CEOs that share the lead with the top management team members reap substantial financial performance increases over those CEOs that hoard leadership to themselves.

FIGURE 2

Seven steps to the implementation of shared supply chain leadership



Source: Authors

Developing shared supply chain leadership

So what's the best way to go about developing shared supply chain leadership? There are seven key steps necessary for developing shared supply chain leadership (see Figure 2).

Step 1: Select for character orientations.

Clearly, selecting the right people is paramount to any endeavor. With shared leadership, however, what constitutes the right people is somewhat different from what you might expect. While its always sensible to select people with the task, leadership and followership skills that are required for the work at hand, these skills take a back seat when selecting for shared leadership. That's why we use the term *orientations* in this step, as opposed to the terms *knowledge*, *skills* and *abilities* (KSAs) that human resources departments use when talking about the "right people." We believe that most people can learn most skills, but their orientation toward tasks and people is based more on their character.

A primary challenge for shared leadership is that it requires the individuals involved to be able to keep their egos in check and work toward a common cause. This, however, is not easy to do, particularly when the people involved are bright and very capable. But it is essential that people set aside their egos in order to shift their focus from the "me" to the "we" perspective. A shared leadership orientation is required for shared leadership to thrive. Table 1 provides a self-scoring questionnaire for assessing shared leadership orientation.

TABLE 1

Shared leadership orientation scores and interpretations

Please rate the following statements using the scale:

1 Strongly disagree 2 Disagree 3 Neither 4 Agree 5 Strongly agree

Do not think about your responses too long—your first inclination is usually the most accurate.

STATEMENT	RATING
1 I find it easy to follow the lead of others, even when they report to me.	1 2 3 4 5
2 Groups need more than one leader.	1 2 3 4 5
3 Effective leadership requires multiple leaders and followers in any given group.	1 2 3 4 5
4 The most important thing for a leader is knowing when to follow others.	1 2 3 4 5
5 Collaboration is more important than being in charge.	1 2 3 4 5
6 Leadership can come from almost anyone.	1 2 3 4 5
7 Most people can provide some effective leadership in a group.	1 2 3 4 5
8 Nearly everyone in organizations is able to lead others.	1 2 3 4 5

SCORING ROUTINE

STEP A
Add your scores from statements **1, 2, 3, 4, 5, 6, 7** and **8** and put the total here

STEP B
Interpreting your score—see the table below:

SHARED LEADERSHIP ORIENTATION SCORES AND INTERPRETATIONS			
Score	< 20	20-28	> 28
Orientation	LOW	MODERATE	HIGH
Interpretation	People with scores in this range prefer not to collaborate with others. They function best in individual contributor roles.	People with scores in this range are average. They can function effectively in groups but do not necessarily seek out opportunities to collaborate.	People with scores in this range strongly desire collaborative work. They thrive in collaborative environments.

Source: Authors

Step 2: Select for task, leadership and followership KSAs.

Obviously, if individuals are going to share supply chain leadership they must also have the necessary knowledge, skills and abilities for the tasks at hand. Otherwise you would simply have the proverbial blind leading the blind. That said, besides task-relevant KSAs, the individuals involved in sharing supply chain leadership need to possess well-developed listening skills in order to effectively receive leadership from others, which is the cornerstone of shared leadership.

Furthermore, individuals must have a healthy respect for the ideas and perspectives of others. And all of this is for naught if they're hesitant to provide leadership to others. Without the gumption to provide leadership, it simply doesn't matter how smart a person is—their knowledge will be wasted, and shared leadership will fail. They must be willing to voice their perspective while stepping forward to lead *and* listen to others while stepping back to follow. In other words, they must be comfortable both leading and following. They must be open-minded; they must not be thin-skinned; and they must desire to share the lead.

You might be in the situation of inheriting a group, be they comprised of organizational insiders or involve people from multiple organizations, in which case you won't be able to select the people in the group. But having a clear idea of the orientations and KSAs that promote shared leadership does provide a guide for future selection. Moreover, in the short term, it's possible to nudge people in the direction of the desired orientations and KSAs through targeted training and development efforts, while moving forward on the other steps toward shared supply chain leadership.

Step 3: Create a shared vision.

If people are to coalesce around common goals, they need a common vision and purpose as their guides. Research shows us how profoundly a common vision affects many group dynamics, facilitating positive dynamics and mitigating negative ones. With that said, most supply chain leaders overestimate the extent to which vision is truly shared, especially those across supply chain partners.

While a common vision can start to be formulated by a hierarchical leader, the involvement of other members of the supply chain is extremely important because it enhances ownership, commitment and persistence. So, it's important to engage others in creating the vision—a *shared* vision—rather than relying on a top-down vision (which is typically the case in supply chains). A shared vision helps to guide action in the face of ambiguous signals from the environment, and it has a clearly documented, positive impact on performance.

Step 4: Focus on core values, especially mutual respect and trust.

Core values contribute to a common perception of what the supply chain stands for, why it exists—and this is all the more challenging when the supply chain involves multiple organizations. Core values help to buttress the group's resiliency in difficult times and strengthen its members' resolve to achieve its vision. Core values help to distinguish the group—whether it's a small group, a larger unit, an over-arching organizational entity or even a society—from other groups. These core values then become a source of long-term competitive advantage, assuming that they are positive values that are difficult for others to copy.

Mutual respect and interpersonal trust are critical values for the development of shared supply chain leadership. Emerging research from neuro-economics has even demonstrated that trust is linked to the economic success of nations and societies. Because small groups are the fundamental building blocks of larger social entities, they are where the basics of trust must be built. An important component of trust building is open communication, which helps to generate an ebb and flow of ideas within the supply chain and keeps people from second-guessing others in the knowledge-creation process.

Step 5: Build an awareness of who has which KSAs.

If shared supply chain leadership is to function effectively, the people involved need to know to whom they should look for leadership for any particular task or situation, i.e., who has the most-relevant KSAs. Scholars use the term *transactive memory system* to indicate the extent to which people are aware of who has the most relevant KSAs for a particular topic. Transactive memory is necessary for leadership to transition to the most appropriate person or persons for a given task.

It's all well and good to say that leadership should be shared, but it's imperative that the correct person be leading at the correct time, based on their knowledge of the task at hand, and not on personality or some other non-pertinent factor. So how do supply chain members ensure that the correct leader for a given task is identified? By having group norms that encourage the debate of ideas among members of the group. Research clearly demonstrates that having these norms drive creativity and innovation and develop a keen awareness of what each group member has to contribute. Transactive memory, and constantly improving it through active debate, enables groups to proceed to the next step in the development process.

Step 6: Embrace continuous learning.

Shared supply chain leadership requires a philosophy that embraces learning, as opposed to a strict, myopic focus on supply chain performance. By embracing learning, a more robust leadership infrastructure is developed, which enables the supply chain to absorb the inevitable shocks to the system, such as the turnover of key personnel. Here we want to emphasize that continuous education, training and development are important for all employees in the supply chain, not just those in formally designated leadership positions. In a similar vein, evaluation should be used as a tool for development and intervention (360° assessments are one potential mechanism to employ), not simply as a way to beat up people.

We don't want to give the impression that evaluation should only be used for development. Evaluation plays an important role in judging the contributions of individuals and groups, which might lead to redeployment of some people who don't fit into their current role. Our point is that evaluation is typically not leveraged for learning as much as it can be. Learning is key for the ongoing development, deployment and delivery of shared supply chain leadership results.

Step 7: Use group-based rewards to solidify shared supply chain leadership.

Compensation is another often overlooked mechanism for leveraging leadership talent, especially when it involves multiple organizations in a supply chain. Here, however, you could utilize group-based compensation, such as gainsharing, that encourages shared leadership within and throughout the supply chain. Gainsharing is a system that establishes a baseline of productivity and then shares any gains in productivity between the concerned parties, regardless of any outside impact on profits. Productivity is much more under the control of supply chain members than profit and therefore is potentially much more motivating. Gainsharing is just one example.

There are many ways to build group-based rewards into any supply chain, no matter how big or small. At the micro-level, for example, group celebrations of key milestones can prove an important tool to sustain motivation to keep moving forward. At the larger organization level, profit-sharing and stock ownership can prove useful tools, because they provide stronger identification with the larger organization. This is challenging when it involves multiple organizations, but creatively approaching such endeavors opens the possibility for novel ideas regarding how to incentivize and reward members of supply chains—how to make them more unified in pursuit of supply chain goals.

The point is that group-based rewards are critical: They help to solidify group identity, group effort and group success. Research is clear on this: People engage in greater levels of teamwork when they receive group-based pay. Moreover, they are much more satisfied with pay when it contains a group-based component, even when their pay is less than those paid strictly on an individual basis. So, be creative and identify group-based rewards that complement your particular supply chain circumstance.

Beyond the management myth

It should be clear by now that we advocate empowering everyone, at least to some degree. Nearly every single person is capable of taking on some leadership responsibility and contributing to positive supply chain outcomes. Encourage those with the most relevant knowledge, not simply those with the highest status, or most extroverted personality, to provide leadership. This means looking beyond artificial borders to tap broad sources of input. Often it means looking outside the organization to involve customers, suppliers, and other important stakeholders in the leadership of the supply chain. While this can sometimes be uncomfortable, it can also be quite rewarding.

It is time to move beyond the moribund myth of management (or leadership) influence primarily flowing in one direction in our supply chains? Obviously, the answer is yes. When people share the lead they share purpose; they share ideals; they share commitment; they lead each other to superior outcomes.

The most successful organizations in the world practice shared leadership—firms like W. L. Gore, Southwest Airlines, Herman Miller and Panda Express—yet the infusion of shared leadership into the supply chain function has not, to date, gained much traction. Why? It is difficult; it means dealing with the paradoxes inherent in shared leadership; it can appear to some that they are giving up control (but the truth is that control becomes more robust); and it requires a fundamental paradigm shift.

The most compelling reason for developing shared supply chain leadership is that your competitors will have great difficulty replicating this paradigm shift, so it can be a source of long-term competitive advantage. Is your organization ready to embrace shared supply chain leadership? Only you can answer that question.

The CONCRETE CEILING

Some manufacturers and distributors are hiring recently incarcerated individuals in their plants and DCs. To make it work, you have to break through the "concrete ceiling."

BY HARRY HANEY, THOMAS M. DECKER, JENNY KIM, MONICA ROTH, HOLLY WARDEN, R. BRAY MCDONNELL AND MARK MULROE

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Editor's note: In the September 2020 issue of Supply Chain Management Review, *we published "Abilities-First: Steps to create a human-centric, inclusive supply chain," an article by Sriram Narayanan, Ed Terris and Arjun Sharma. The authors focused on hiring people with disabilities as an untapped resource to address the supply chain talent shortage. In this article, the co-authors explore another untapped resource, individuals recently released from incarceration. In both instances, supply chain managers must make adjustments in their hiring practices, training and processes. Those aren't always easy, and may not be for everyone. But we believe the ideas expressed by the authors of both articles are important to explore as we address talent shortages.*

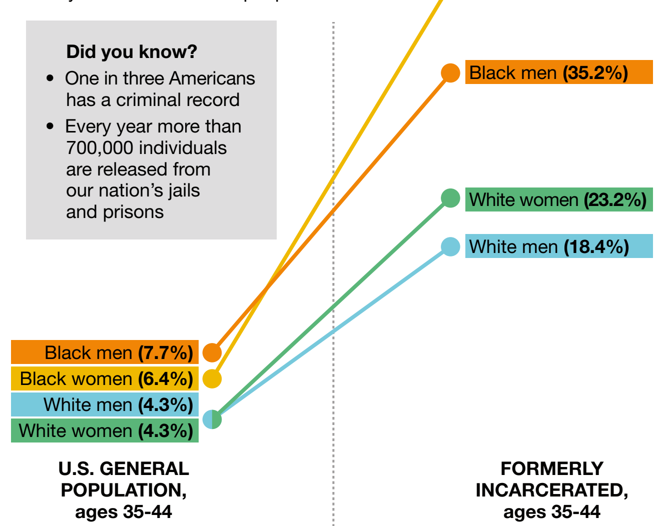
We're all familiar with the "glass ceiling," a term that describes the barriers experienced by women and people of color to getting the job commiserate with their qualifications, and more importantly, getting a promotion. As significant as those challenges are real, they are dwarfed by the barriers to the job market that confront citizens returning to society with a criminal record following a period of incarceration. And remember, many of those are people of color, women and women of color. For the recently incarcerated, overcoming the stigmas—and fear—associated with hiring someone with a criminal record is daunting, even when it comes to entry level supply chain jobs in warehouses, distribution centers and manufacturing plants. As if breaking through the glass ceiling isn't hard enough, the "concrete ceiling" has created a system where the unemployment rate for ex-offenders is often five times that of the general public (see Figure 1).

What's more, the problem is growing. Consider this: When the first Congress convened in 1790, there were only three federal criminal laws on the books: piracy, counterfeiting and treason. Today, that number exceeds 5,000, and that number doesn't include over 300,000 federal criminal regulations. Enforcing them has led to an explosion of incarcerations: While the United States is home to only 4% of the world's population, we are home to 25% of the world's prison population. Today, an estimated one in three individuals has a criminal record. In fact, more people in this country have a criminal record than a college degree. What's more, over 700,000 individuals are released from prison every year after they have completed their sentences and return home to their families and communities. Given the sheer numbers, the sad reality is that individuals with a criminal record aren't hard to find:

FIGURE 1

The "prison penalty" in unemployment

Unemployment among formerly incarcerated people is much higher than among the general public. This disparity is especially dramatic for formerly incarcerated Black people and women.



Source: prisonpolicy.org

They are your neighbor, the parent of your children's friends at school and the stranger in the back pew of your house of worship.

Recidivism rates are staggering, with more than 75% of those 700,000 are re-arrested, and likely returning to prison, within five years of their release. The light at the end of the tunnel is that for those who find a job within one year, the recidivism rate drops to just 7%. "We know that good, steady employment reduces the likelihood of an individual re-offending," Thomas Dart, the sheriff of Cook County, Illinois, which includes Chicago, has stated, "which is why we offer job training and job readiness programs to our detainees in order to help them end the cycle of incarceration." When a job is further complemented by wraparound services that help with housing, mental health and substance abuse treatment, the odds of a successful reentry continue to improve.

The concrete ceiling

So far, so good, right? Especially in the context of the supply chain, which, at least until COVID-19, was experiencing 100% annual turnover in positions in industrial facilities, at ports and shipping locations and in the trucking industry. And, of course, supply chain was not alone in experiencing a shortage of willing and loyal associates. Yet, individuals with criminal records face barriers to resources that are essential to daily living, such as access to housing, education, health care and others. That lack of access creates the virtual concrete ceiling when it comes to finding a job that can seem as oppressive as the physical walls of a prison.

"For many people leaving prison, the majority of whom are poor people of color returning to socially isolated, under-resourced communities, re-entry is more accurately described as 'a temporary position between freedom and re-commitment' to state custody," the researchers Alfred Blumstein and Allen J. Beck have written. It is a vicious cycle that wastes lives, drains state and federal budgets and creates an environment that makes our society less safe.

The lack of resources is exacerbated by states budgets that are overburdened by the rising costs of incarceration, often outspending public education budgets at a rate of nearly two to one. Annually, our country loses nearly $57 billion in gross domestic product these individuals could have contributed to the economy, to say nothing of the downstream effects of incarceration on the family unit. Children with an incarcerated parent are two-thirds more likely to become justice-involved at some point in their own lives, beginning—or continuing—a generational cycle of offenders. The system, as it currently exists, benefits no one. Simply put, the denial of the opportunity to work will result in a continuous cycle of release and re-incarceration that will drain our communities of resources and make our streets less safe.

This is where business can play an integral role.

Business steps up

One potential tool to break through the concrete ceiling is changes in policy. In the past year or so, there has been discussion at the state and federal levels about criminal justice reforms that would create a more equitable and fair criminal justice system. But, reform often moves slowly. In the meantime, there is an opportunity for business to step up. For those companies willing to think differently about their hiring and employment policies, there is an opportunity to expand the hiring pool for quality people who deserve a second chance to build careers and provide for their families.

Without question, employers have concerns about opening their doors to individuals with criminal records—understandably so, but those concerns are surmountable (see sidebar Employer concerns on second chance hiring). Moreover, companies that do take a chance on formerly incarcerated individuals, like Koch Industries, Chicago Green Insulation and A Safe Haven Foundation (see sidebars) have found dedicated, loyal, long-term employees who help their communities heal and thrive, and help their business prepare for a tight labor market in the future.

For instance, Koch Industries, a global employer representing more than 130,000 employees in 60 countries (67,000 of them in the United States), is committed to considering all available talent based on their potential and not their past. Automatically disqualifying one-third of the potential workforce due to past indiscretions makes no sense from either a moral or economic perspective, at Koch, and experience

Employer concerns on second chance hiring

BY JEFFREY KORZENIK

Employers are generally concerned with four broad issues related to hiring people with records: safety, performance, reputation risk and legal liability. All these barriers are surmountable but require a disciplined process of talent acquisition and development tailored for this population of employees.

Safety. Successful talent acquisition models for people with records require a review process that is specific to the open position, looks at the nature of the crime, any pattern of past offenses, the age at the time the crime was committed, evidence of rehabilitation as well as other factors. Ultimately, this boils down to a character assessment that recognizes that an applicant's character is not necessarily defined by a mistake in their past. Counterintuitively, some of the best candidates are not the "low-level, nonviolent offenders" that superficially seem most attractive. Particularly powerful talent pipelines can be established from referral networks from nonprofit workforce development and government agencies that have had the time to build a relationship with the population they serve and selectively refer only those who are "job ready."

Performance. A trickier obstacle is overcoming the concerns of employers who have tried second chance hiring and have been disappointed by the results. Often employers report that such hires are "either some the best employees or some of the worst employees." Even employers who have established a strong candidate selection process report this issue. The solution is to recognize that second chance hires typically need an additional talent support and development process that addresses the needs of this population. Typically, these needs are the result of backgrounds of deep poverty and not related to any criminal record: transportation challenges, lack of mentoring, affordable housing access and even food security. Often the same nonprofits that can refer candidates will partner with employers to provide these "wraparound" services. Increasingly, employers, even those who do not employ people with records, have been hiring "life coaches" and developing other support mechanisms as effective investments to reduce employee turnover and increase productivity. It is important to emphasize that providing these services, either directly or through referrals, is not charity, but a business strategy, and one that typically provides a high return on investment.

Reputation risk. Employers that worry about the reputation risk of hiring people with criminal records should recognize that reputation issues cut both ways. Often companies and individuals want to transact business with firms that are providing societal benefits. Surveys of millennial employees also suggest that they will be more attracted to and stay at firms that have a purpose beyond the bottom line. There is a risk, however, that the buying public associates second chance with "second rate." Although rare, firms that have faced this issue have found that "truth outs," and the quality of the ultimate product or service becomes evident.

Legal liability. Every employer's worst nightmare is being subject to a negligent hiring lawsuit, where an employee's tortious actions can become the employer's liability if the misdeed was "foreseeable." These civil suits are quite rare, but still a legitimate concern for the second chance employer given the potential cost in terms of time, money and reputation. A rigorous and well-defined process for candidate selection is of course a strong part of the defense. Many states offer some forms of protection to employers of people with records. In states like Texas some of this is automatic, while in other states certificates of employability (known by various names) granted to people with records protect their employers if known at the time of hire. Employers should, of course, consult their legal counsel for the available protections in their operating jurisdictions.

The employer's perspective should continue to be one informed by the business case for second chance hiring: People with criminal records are a legitimate and largely underutilized talent pipeline. When conducted with appropriate processes for candidate selection and employee support, second chance hires are highly engaged and distinctly loyal employees. The combination of commitment, low turnover (and associated costs) is a formula for productivity and profitability. Like any successful investment, second chance hiring comes with some level of risk, cost and time commitment—but it comes with a substantial potential return to the business and to the communities in which the business operates.

Jeffrey Korzenik is managing director, chief investment strategist for Fifth Third Bank, and the author of "UNTAPPED TALENT: How Second Chance Hiring Works for Your Business and the Community." The book, which will be published by HarperCollins Leadership in 2021, shares the business case and best practices for hiring people with criminal records.

with its initiatives has shown that some of the firm's best employees are those with criminal records. Conversely, some of Koch's lowest-performing employees have graduated from prestigious schools with impressive resumes. Some have even stolen from the company.

Koch's experiences with formerly incarcerated employees were echoed in a survey conducted by the Charles Koch Institute and the Society for Human Resource Management, where 82% of managers and 67% of HR professionals responded that the quality of their formerly incarcerated employees is the same or higher than their workers without criminal records. The same survey found that most employees, managers and non-managers are open to working with others who have criminal records. With experience, the stigma goes away.

Getting started

There is no question that building a sustainable second chance hiring program can be daunting. Each company must conduct appropriate due diligence during the hiring process, but experience indicates that criminal background or not, employers must be careful with anyone they hire, regardless of history.

With that in mind, here are four actions that Koch has taken in recent years that can serve as a starting point for a business embarking on a second chance hiring initiative:

1. Sign the SHRM pledge, implement the toolkit. Koch Industries collaborated with the

A safe haven for second chance hiring

If you've walked along Chicago's Michigan Avenue in the spring or summer, you may have taken notice of the flowers and vegetation in the landscaped areas. What you may not know is that landscaping is maintained by a crew comprised of ex-offenders receiving their first opportunity of employment from Safe Haven Landscaping, one of the social business enterprises operated by A Safe Haven Foundation.

The Foundation is an Illinois-based not-for-profit that provides social services to the homeless, including housing, substance abuse and mental health services, case management, job training and placement services. Most of their clients have criminal records.

Among its services, the Foundation trains and pays ex-offenders to work in the social business enterprises it operates in culinary arts and catering, staffing and commercial landscaping, and provides them with the soft skills they need to maintain a job. Often these individuals have never been coached in the skills necessary to become a responsible employee—one that employers want to retain. However, after completing a job readiness program that includes work for wages, these individuals become valuable resources to the employers willing to give them a chance.

"It's short-sighted that for many employers, the mistakes an individual made in his or her past are the sole determination of their value as an employee," says Mark Mulroe, the Foundation's executive vice president and chief operating officer. In Mulroe's experience, ex-offenders who are placed in jobs after they receive support services at A Safe Haven have higher rates of on-time attendance, retention and advancement, and lower rates of absenteeism than employees without a criminal background. They also work harder and have a greater sense of loyalty to employers who give them an opportunity, due to the inherent difficulty of obtaining employment.

During the coronavirus outbreak, for instance, individuals in the Foundation's Cook County Jail Program filled many of the jobs established to care for COVID-19 positive individuals. Eager to receive training that might position them for jobs in a health care related field, they stepped-up to be patient care assistants, facility maintenance personnel and served patients in isolation. They also learned the proper use of personal protection equipment, the correct procedures for maintaining and disinfecting an isolation ward and skills required in patient customer care.

They often out-performed other workers who were already employed by hospitals. Believing that their training and experience would provide them with skills that may differentiate them in the job market, they were attentive, motivated and dedicated to their new roles. Not only that, they were grateful for the opportunity to prove themselves and break the stigma of their prior mistakes. Mulroe believes those types of attitudes and loyalty are traits that should be valued by all employers and are often lacking in many workforces.

Society for Human Resource Management (SHRM) to develop the "Getting Talent Back to Work" pledge and employer toolkit. Since then, a broad coalition of diverse businesses, representing more than 50% of the American workforce, has pledged to consider hiring individuals with criminal histories. Whether your business has never engaged in second-chance hiring or you are already swimming in the deep end, the toolkit is a great resource to help navigate these waters by presenting the latest research, evidence-based practices and industry guidance needed to reduce legal liability and increase inclusive hiring. Information regarding the pledge can be found at gettingtalentbacktowork.org.

2. Engage other second chance hiring businesses. Don't be afraid to visit other second chance hiring businesses on why and how they successfully hired and retained people with criminal records. Great models and best practices are out there, and most companies are willing, even eager, to share their experiences in this area. Learn from one another and share best practices and failures.

3. Work with a workforce development service provider. Develop a relationship with a reputable workforce development service provider in your area to help identify potential candidates who are ready for work. A provider will improve the odds that your business, as well as the potential employee, will both be successful.

4. Start with one. If you're new to hiring people with criminal records, start with just one, then wade deeper in you gain experience and wisdom.

There are other steps a company can consider. Mark Mulroe, the executive vice president and chief operating officer of A Safe Haven, suggests that an important step is removing the stigma of being an ex-offender in the workplace. Beyond that, he adds, employers can help by providing new hires an advance on their wages to obtain housing and transportation, services most of us take for granted, and that can also make the difference between an employee's ability to focus on their job versus whether they'll have a roof over their head.

Tom Decker, president of Chicago Green Insulation, urges employers to ask potential candidates "to be transparent about the past issues that got them incarcerated. Do face-to-face interviews with these candidates. Listen for the responsibility they take for their actions and the growth they have experienced since their failure. How committed are they to their sobriety? To their child support? To their future that may or may not involve you."

Each of us deserves a second chance. Starting today, let's work together to break down these barriers and become employers of true second chances.

An extra mile and a second chance

Tom Decker, the owner of Chicago Green Insulation (CGI), is willing to go the extra mile to get the best candidates for his spray foam insulation services. Sometimes, that means going the extra mile to give incarcerated men a second chance. Recently, Decker traveled to the Dixon Correctional Center, a medium security male prison, as the guest of Cliff and Sue Parish. The couple operates Freedom from Within, an organization that runs classes that help incarcerated men embrace the skills necessary to making the internal changes to make their lives better today and prepare them for life after incarceration. This gives Decker the inside track on the best people when they become available.

Decker and his company are deeply connected to a network of faith-based job placement and preparation organizations in the Chicago metro area focused on construction trades including Sustainable Options for Urban Living and IMAN, Inner City Muslim Action Network. In his experience, returning citizens demonstrate a very high level of ownership in their work, as illustrated by a recent experience with a top customer, for whom CGI had recently completed a big assignment. The customer called to say that they were delighted with the work of CGI's staffers, both of whom were returning citizens. The customer further requested these staff members handle their future projects due to their sense of urgency and professional manner.

You can learn more about Freedom from Within at freedomfromwithin.org.

RISK MANAGEMENT IN AN ERA OF EXTREME UNCERTAINTY

Uncertainty is the new normal for supply chain managers. There's no silver bullet, but these 10 ideas may provide a template for managing in uncertain times.

BY SUMANTRA SENGUPTA

The year 2020, like the month of March, came in like a lamb and is poised to go out roaring like a lion. Early in the year there were minor rumblings in the equity and bond markets, increasing trade tensions and tariffs between the United States and China and the kind of heated political rhetoric you would expect in an election year, but nothing alarming. The first hints of trouble came in late January, with reports of a new virus emanating from the Hubei Province of China. The initial reports were sketchy and seemingly censored by a country that accounts for almost 19% of global GDP. But in the weeks that followed, the world woke up (and is still waking up) to a virus strain called COVID-19 that has so far infected an estimated 10 million people and killed nearly 500,000 worldwide—with the count rising daily. Countries on every continent went into lockdown, and global supply chains came to a halt. Empty shelves inside U.S. grocery stores resembled photos from Russia during the deprivation years.

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It all seemed—and still seems—unfathomable. Perhaps, we let our guard down during a decade of unprecedented growth following the 2008 Financial Crisis. In the supply chain, we paid less attention to risk management, mitigation and supplier diversity strategies. Instead, for decades, supply chain managers and corporate executives concentrated sourcing in low-wage markets to take advantage of labor arbitrage opportunities, especially China. One of the results is that in the 17 years since the 2003 SARS epidemic, China's share of the world GDP grew from roughly 3% to 19% at the start of the current pandemic. No one seemed to care when a rising tide was lifting all boats. Then the tide went out with the pandemic, exposing the vulnerabilities we had ignored.

After a decade of stability, the new normal is an era of uncontrollable external variables and uncertainty. That needs to be the focus of operations executives going forward. There is no silver bullet, but the following 10 ideas for risk management can serve many companies across the globe with a template that can be modified and adapted for specific uses.

Let's start with two exhibits.

Figure 1 lists the ideas that I believe will shape supply chains going forward.

FIGURE 1

Forward-thinking risk management ideas

1	Business will not return to "business as usual"
2	Viewing global operations as a community as opposed to a chain; apply PESI rigor to the decisions
3	Adapt disaster recovery concepts from information technology across the corporation
4	Apply a red, yellow and green rule of 10%
5	Move away from a "one-size-fits-all "approach
6	Think about the various aspects of the outsourced chain in a greater modular fashion including the gig economy
7	Focus more on synchronizing demand and supply buffers
8	Modernize inventory management away from the balance sheet
9	Identity the weakest links in the community and chain and apply the constructs on that link
10	Calculate and publish the enterprise supply chain risk score (ESCRS)

Source: Author

FIGURE 2

Applicability across products and services sector

	Relevance for **products** sector	Relevance for **services** sector
1	HIGH	HIGH
2	HIGH	HIGH
3	HIGH	HIGH
4	MEDIUM/HIGH	MEDIUM
5	MEDIUM/HIGH	MEDIUM
6	MEDIUM/HIGH	LOW/MEDIUM
7	HIGH	HIGH
8	HIGH	LOW
9	HIGH	MEDIUM
10	HIGH	HIGH

Source: Author

Figure 2 shows the degree of applicability of these ideas across the products and services sector.

Now, let's explore the 10 ideas in more detail.

Business will not return to "business as usual."

We'd all love to believe that society will learn to live with the pandemic, supply chains will prepare for a similar attack in the future and we'll all go back to business as usual. As Hemingway wrote: "Isn't it pretty to think so?"

In truth, business as usual is unlikely to return any time soon. And, it would only create a comfort zone that paralyzes the fundamental changes that need to occur in how the value chain interacts with the rest of the business and customers. Instead, a business model for the era of uncertainty must factor in transparency at all stages and consider additional risk management elements in all areas of the order-to-delivery process, along with the ability to adjust processes accordingly.

Adding just-in-case inventory buffers or augmenting lead times, two strategies under consideration, is not enough because these are just transitional buffers. Instead, the new business model must depict how supply chains are positioned to react immediately and over a sustained period. I would counsel companies away from using their internal processes and metrics for externally-oriented and consumer-driven actions because they will end up failing to make necessary transitions and impair their internal processes at the same time. Rather, companies need to develop new supply chain risk management playbooks and the capability to shift from growth mode to sustainable mode to "war time" mode in a matter of days.

View global operations as a community; apply PESI rigor to the decisions

One of Webster's definitions of a chain is of a group of the same kind or function, usually under single ownership, management or control. This definition implies that a supply chain is a series of interrelated functions that are connected by a unidirectional/single process flow, with some coupling governance. That view worked reasonably well up to now.

Traditionally, the supply chain has been partitioned into silos of functional activities that span design-to-delivery processes. Managers have focused on extracting value from their individual silos. Now, they need instead to view the supply chain as a process that spans organizations, and in many instances spans multiple countries as part of. a value exchange community. On the surface, that may seem like a small change, but for many businesses, implementing it has been an overwhelming struggle. Its particularly difficult because it requires an outside-in focus as opposed to an inside-out focus. In addition, the traditional internal activities that value chain managers have practiced for years now need to focus externally on the B2B and the B2C processes and interactions. Traditionally, those have not been within the purview of supply chain executives. This new focus will require new skills and training if professionals are to add external partnering and global diplomacy to their skill sets.

Companies must also start utilizing political, economic, social and impact dimensions, or PESI, with a much higher focus on the E, S and I, to evaluate the supply chain community that is part of their ecosystem. The economic, social and impact elements allow us to discern the methods by which political pressure will mount. In India, for example, the government's ability to shut down the entire country for 21 days, despite the huge E and S impact, is a testimony to the country's currently strong political dynamics. Similarly, Italy and Spain demonstrated similar traits, but not in a timely fashion. Meanwhile, South Korea and Japan demonstrated unique combinations of P, E and S to combat the pandemic.

Companies will benefit from using a framework that takes a holistic view of a global design-to-delivery process and overlays the elements of PESI across processes to re-evaluate their decisions and build in redundancies and contingencies. The future requires that partner companies in the global supply chain be situated in areas that are totally open to random visits by risk inspectors who can be governmental or private. The era of supply chain information censorship is over and countries that do not abide by these rules now must do so in order to continue being a part of the ecosystem.

Adapt disaster recovery concepts from information technology across the corporation

Global chief information and security officers will attest to the fact that a disaster and cyberattack recovery plan has become table stakes for the well-being of their organizations, their sanity and in most cases their jobs. I recall 10 years or so ago when organizations were continually cutting costs and corners when creating and implementing a DR plan—there was never enough money, time or attention paid to the concept. Today, after waves of cyber hacks against companies like Equifax and Target, the topics of cyberattacks and disaster recovery have been elevated to the board room.

Now, we're challenged by a pandemic, a global financial slump and social unrest. Why not use those crises as the catalyst to create a comprehensive global supply chain disaster recovery plan?

The elements would cover what happens when physical assets across the supply chain are suddenly operating below capacity or are shut down; the talent and skills required to get through a pandemic or global disaster; the technology needed to support a different mode of operation; and the recommended uptimes and inventory buffers that may be required to weather sudden and unexpected drops or spikes in demand. The elements listed above would serve as the basis for ongoing dialog with the extended value community* and codified into a living, breathing document that is updated every one year to 18 months.

It's also important to run a series of simulations in which the company's response to key scenarios can be evaluated and the plan adjusted accordingly. The results could serve as a basis for an operations disaster recovery function or command center that understands all the roles and responsibilities once the alarm bells are sounded. I believe that the San Antonio-based retailer HEB has had an operations recovery center in place for many years because they deal with natural disaster recoveries almost on a yearly basis.

Apply a red, yellow and green rule of 10%

We've all heard that a picture is worth a thousand words. Couple that with the usual executive attention span of 30 seconds or less (on a good day) and it's almost mandatory to utilize a visual concept that is hard wired into our brains: Red means danger or stop, yellow means slow down or caution; and green means go or we are in steady state. A risk dashboard that visualizes the elements of parts, ingredients and subassembly procurement and sourcing to gauge the dimensions of PES (political, economic and social) risk; the actual delivered quantity risk; the risks from geopolitical issues in all modes of freight; and finally the risks involved in final assembly and delivery to the end customer can all be accounted for at the appropriate level on the red, yellow and green (RYG) dashboard. The metrics to support when a level changes color will be determined by the company's business model and the desire to manage the risk profile.

This is no different than any other elements of risk management—some risks are worth taking and some need to be treated with "insurance policies," which imply alternate sourcing and production, alternate component materials as well as distributed inventory. Once the metrics are set, it is advisable to run a series of simulations with different input data streams to test the boundaries of the color-coded signals. For instance, if demand triples in a one-month period, which components in the OTD supply chain stay green or change to yellow or red. Then apply business probability to whether the chance of demand tripling is high, medium or low and adjust the supply chains accordingly.

These types of rapid adjustments are feasible when companies don't have huge capital investments in an outsourced infrastructure. In cases when capital investments in the physical and human resource infrastructure have skewed sourcing decisions heavily in one geography or region, it's wise to take a phased approach to building redundancies in the chain despite the costs. Don't put all of your eggs in one basket.

During my last industry assignment as the group president of a global agricultural processing and trading company, I was tasked with leading the charge in the field of product sourcing when pricing in the United States for a particular commodity rose around 35% in a three-month period and we didn't have corresponding sales price offsets to buffer the losses. It took about four years to develop alternate global delivery chains that buffered the company from those kinds of supply price swings by seeking alternate vertically-integrated delivery chains from four regions in the European Union and two regions in Africa.

An RYG dashboard is a great addition to the supply chain disaster recovery plan with regard to rigorous PESI evaluations. In the final stage of testing and simulation, always ensure that the bands in which the RYG stay the same color have enough buffer to weather demand and supply swings, and then add an additional 10% stress to test the worst case scenario and see if they still hold. As a consultant, I have used a 10% rule with my clients for years. Early in the pandemic, manufacturers of essential supplies, like Clorox, would have benefited by having a similar mechanism in place to minimize empty retail shelves and depleted online channels. In their absence, price gouging and a flood of substandard products were at all-time highs.

Move away from a "one-size-fits-all "approach

For most companies today, there should be no such thing as the supply chain—as in the one and only supply chain. In practice, there must be multiple supply chains to suit the characteristics of the products and the channels through which they are sold. If supply chain management is done right, it must extend all the way from sourcing to final delivery to the customer and cover everything in between. Most companies have struggled with integrating globally dispersed supply chains and their associated functional silos under a common organization and reporting structure. They have also had difficulty identifying metrics that tie all the functions into a loosely coupled entity. Factoring in the elements of PESI will enable a reboot of the supply chain design process and, in many cases, an almost blank sheet approach is highly recommended.

It's common to apply the same planning, procurement and logistics techniques to all products and channels, but it's a mistake. I often refer back to a seminal article in the field of supply chain management by Marshall Fisher: "Which supply chain is right for your product?" Fisher provided an excellent framework that used product and channel characteristics to determine the right mode of operation for different supply chains. It's even more important to get this right as companies mix product portfolios that have differing characteristics. The most practical approach is to determine the points of commonality and channel convergence across the different supply chains an organization runs. The arrangement still permits risk-adjusted localization and separate management for disparate functions. However, it creates the challenge of decentralizing many previously centralized functions. Creating the right cost structure for multiple risk-adjusted supply chains requires significant transformative thinking as well as organizational constructs that don't fit conventional logic.

Think about the various aspects of the outsourced chain in a greater modular fashion including the gig economy. Traditional thinking has always called for degrees of vertical consolidation/proximity because the delivery efficiencies and associated cost savings are most often directly proportional. However, when you add the element of risk to this binomial problem, it becomes a trinomial issue—and then the answers aren't always clear. We need to look for modularity and decoupling points within the design-to-delivery process and test the decoupling points for potential risk-adjusted moves. A decoupling point is one in which a natural break can occur in a supply chain without changing the flow or product characteristics. Examples of this can be seen in garment production, where fabric sourcing is often decoupled from the distributed production process. I am sure if someone were to do a fresh case study of Zara under the light of risk management, a company that is often held up as a shining light for efficiency, the results would differ from prior years, especially given the amount of time Spain was shut down.

High-tech companies have used variations of decoupling points for decades with the concept of modular manufacturing, sub-assemblies and light assemblies which are distributed globally. Consumer-facing staple product companies and flow-centric companies have not adopted the processes as effectively as they should, which is showing in the huge number of out of stocks we are currently facing.

In addition to the risk adjusted physical and digital decoupling, we should also consider the effective use of fractional workers and the gig economy. Putting aside the politics surrounding the classification of gig workers as employees, companies should be thinking about a semi-trained contingent, or "on call" workforce that can be deployed even in technical tasks as needed in the event of a Red trigger on the visual dashboard. This necessitates an investment in training and development coupled with flexible human resource policies so that in the event of a risk factor for people-centric processes a backup system is already in place.

Focus on synchronizing demand and supply buffers

Companies that have implemented demand and supply planning systems that have never been tested for risk will suffer significant financial setbacks. That's because poorly-synchronized demand signals and regionally-concentrated supply responses create more problems with inventory availability than what the future global dynamics will find acceptable.

Companies must think about utilizing concepts from financial models such as Alpha (to measure location market risk) and Beta (to measure historical asset volatility) to overlay onto operational forecasts. They will need to move closer to the actual point of consumption as a starting point and adjust that for global sourcing and production alpha and beta measures to calculate the baseline number that will be used in the traditional materials inventory calculation backflush calculation.

Additionally, after a dip or spike in demand, careful extended supply chain planning is critically important because downstream and upstream partners may have arrived at their own calculations for the future. That can lead to a resurgence of the bull whip effect. There is already chatter about farmers rethinking their cropping patterns due to the sudden spike in the pseudo consumption of canned goods and the associated worry that consumers food habits may remain changed for a while. All this synchronous work will require added capabilities in people, process and technology because these elements have not been used in the past and no technology platforms exist that can accommodate these measures.

Modernize inventory management away from the balance sheet

Some 30 years ago, I took an advanced inventory management course from Jim Masters, now retired from The Ohio State University faculty. While I've long forgotten the concepts and calculations we learned, or replaced them with my own work, one statement has remained with me over the years: When asked about inventory levels, he always answered "it depends." That one statement is probably more profound today than ever, as companies chase well-intentioned working capital reductions, pass working capital risks to their upstream and downstream partners and delegate more control to their CFOs than was ever intended. Companies should become more transparent in segmenting their working capital needs along four categories and utilize the same construct within product lines and business units: They are standard safety stock; strategic safety stock; risk stock and, finally, catastrophic reserves.

Standard safety stock is well understood and needs no explanation. Strategic safety stock is used for competitive maneuvers, promotions and other normal shifts that happen during a fiscal year or two, like new versions of products. The third and fourth categories require a multi-year mindset, especially for products with a longer shelf life. Think of these as stockpiles like the government's strategic reserve of oil, there in case of an emergency.

Companies that cater to food and health safety for countries need to strongly consider balance sheets that will cover all elements of the four stocking levels. While this will sometimes seem counterintuitive to the immediate well-being of the last two elements of stock, managed localized risk (risk stock) and strategic reserves (pandemic stock) can be clearly differentiated. In some cases, these may be treated as the same as long as the reserve is monitored and not used for normal day-to-day business activities. We also need to start thinking about classifying our normal working capital measures, such as inventory turns, to signify risk and reserve stock. Companies should not be penalized by public market analysts for a balance sheet that may now look different.

Examples of this approach are quite common in regions such at the Middle East and North Africa, where private companies are active participants with governments to help with the management of strategic reserves. However, this will require educating CFOs and analysts, which will happen with sustained messaging and by adoption by some of the *Fortune* 1000 entities.

Identify your weakest links and apply the constructs with rigor

From 2000 till 2013, there was a British TV show called "The Weakest Link." Anne Robinson, the host, was famous for saying "You are the weakest link. Goodbye," as contestants left the show. That line applies to highly-distributed supply chains, with partners across the globe: Our best designed risk management strategies will amount to nothing if the weakest link in the chain does not share the same levels of urgency/capital/desires to participate in the overall process. The garment industry has been under scrutiny for years because of the reliance on sweat shops in low-cost countries such as Bangladesh and Vietnam. They are the weakest link in the apparel supply chain. This has led larger companies to put in place monitoring guidelines and safety and quality measures for any portion of the OTD supply chain that could have an impact on the brand.

We need to apply the same rigor with which we protect our corporate reputations to the management of risk in the extended value chain/community. This would mean having the ability to apply the same levels of rigor to strategy, process and people to the weakest links that we adopt for the strongest partner in the chain. This will require the ability to potentially downsize the number of partners, utilize PESI mechanisms to alter and shift sourcing decisions as well as maintain an ability to treat investments that are "off balance sheet" to be viewed under strategic investments as an asset under the current GAAP measures for U.S.-based companies and IFRS measures for non-U.S. companies. However, we need to approach this exercise as one of a total system-wide restructuring and not settle for making minor tweaks once the current disruptions are largely behind us. Remember: Business as usual is unlikely to return any time soon. And, as they say: Never let a crisis pass by without making the changes that have been on the drawing board for a while.

Calculate and publish the enterprise supply chain risk score (ESCRS)

The Enterprise Supply Chain Risk Score (ESCRS) needs to become part of the lexicon of all companies. This is a balanced scorecard that measures risk along the areas of design, sourcing, production, logistics and customer service. With the exception of design, these represent the areas of the SCOR model already embraced by many companies. Keeping that current will be of highest importance at the board level and in time on Wall Street and Main Street.

This scorecard must present an aggregate supply chain risk score (SCRS) for the enterprise along product lines or business units, and also have the details of the SCRS for each individual product line. I would suggest that the risk score be classified in a numerical amount: 0–100, with 0–30 being low risk, 31–70 classified as medium risk and anything over 70 considered high risk.

A company can change its measurement scale to match its numeric preferences. However, the calculation of the score must include all elements of concepts three through nine and must be signed off on by the executive management team before being agreed to by the board of directors. This exercise must be repeated every three months to six months based on the scorecard (more frequent updates may be required to manage a high number of high-risk scores).

As I've noted, business as usual in the future is unlikely to look like business as usual today. The effects of the pandemic, difficult financial times and social unrest are likely to be with us for some time. Companies readying their supply chains to meet these new challenges would be wise to consider these 10 risk management concepts to succeed in an era of extreme uncertainty.

**The extended value community, or EVC, is a construct I introduced in "The New Rule," published in 2002. The idea is that supply chains have evolved into global supply communities. Supply chain managers need to expand their view beyond the enterprise to include key supply partners in order-to-delivery processes.*

Right place, right time, right quantity

Companies invest years and millions optimizing their inventories. It's time for a new approach to calculate safety stock while still meeting customer service during critical promotion periods.

BY DANIEL COVERT, JOAQUÍN ORTIZ AND TUGBA EFENDIGIL

It isn't easy to get inventory levels right, especially in food retail. Something is always in flux. Seasons change and holidays come and go. Meanwhile, canned pumpkin and cranberry sauce are top-moving items in the runup to Thanksgiving, but are relegated to the bottom of the shopping list come the Fourth of July.

However, the seasonal calendar is not the only influencer of inventory levels. There's also the matter of promotions—every inventory manager's favorite. A typically slow-moving salad dressing can become a shooting star overnight when displayed and promoted aggressively. Not to mention promotions for non-food retail items from shampoo to toilet paper, which actually doesn't need a pandemic to fly off the shelves.

Seasonality and promotions are too often the bane of major investments that companies make to optimize their inventories. But they are also important components of the food retail business and not going away anytime soon. Competition is especially acute in the low margin world of food retail. There is always a fight for market share and profits despite a sliding scale of discounts and other forms of price reductions. It isn't easy to be careful out there while food retailers battle to differentiate themselves, attract new customers and make a lasting impression on consumers as having the lowest prices every day.

There's also the matter of trying to keep shelves stocked under all of these shifting conditions with all of those key SKUs. No customer wants to see an empty shelf where the last ingredient in the perfect holiday recipe should be on display. If that happens often enough, shoppers just aren't coming back. They'll try some other store. We've all been there.

Most retailers try to address these concerns with inventory policies that set safety stock levels based on an ABC analysis of three item classes (A, B and C). The most common method of classification is based on Pareto's principle that 80% of sales are typically generated from the top 20% of SKUs.

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However, this approach often fails to alleviate the immense pressure on inventory managers to always have enough of key items in stock. Poor availability during a promotion could lead to a permanent loss of customer trust. As a result, both demand management teams and retail stores often disregard established inventory policies in favor of a don't-run-out mentality. The compulsion to order a little extra inventory (in some cases, up to 20% above forecast) is very real.

Unfortunately, this practice places intense pressure on the supply chain to maintain high availability. Worse yet, such emotional inventory management practices during critical selling periods often result in inventory peaks that greatly exceed actual demand of these items. And the cleanup afterward is often painful.

There has to be a better way.

The problem with workarounds

Leading up to promotions, it's important to purchase just the right amount of product. The average vendor lead time is 10 days and it is hard to rebound if too little product is purchased upfront. Conversely, selling through excess inventory after the promotion is not the objective. To buffer against demand and forecast volatility, companies need an inventory policy that increases safety stock just enough on the "most important" items. But the critical question remains: Exactly how much is just enough?

During promotions and holidays, these important few products (that are forever changing) require active management. Think canned pumpkin and cranberry sauce. And given the range and variability of products carried by grocery retailers, it is difficult to live by a one-size-fits-all inventory policy. Clearly, it would benefit all to move from emotionally driven order placements to a technique that mathematically incorporates buyers' intuition into inventory models that determine dynamic cycle service levels (CSLs).

Unfortunately, the large number of SKUs affected by holidays and promotions is a given. That is further complicated when an inventory management group is responsible for inventory at both retail store locations and at distribution centers. Success here requires a two-echelon system that balances inventory between the two types of locations. When retail stores are heavy with inventory, less safety stock is needed in distribution centers. The challenge is to have inventory in the right place, at the right time and in the right quantity.

At a typical DC, the CSL target for each item is calculated on a weekly basis. Key variables include the previous week's movement, number of deliveries, minimum shelf presentation requirements and ending inventory.

While this method can be used to calculate the CSL using readily available numbers, the results are backward-looking and fail to address future demand fluctuations. In practice, a demand management team sets a floor and ceiling for the CSL. However, most items end up at either end of the spectrum, leading to many manual workarounds outside of standard service policy.

Here's how one solution might work. If a promotion will last one week, order the forecasted demand for the week prior to the promo, the promo week and the week after the promo. Also, plan to have demand for all three forecasted weeks in the warehouse nine days prior to the promotion's start date.

On the one hand, this approach is more mathematical than the just-add-20% emotional response. On the other hand, there is nothing standard about this approach. It requires substantial manual intervention and removes any systematic calculation of safety stock. To further accentuate the "specialness" of this approach, the promoted items are designated as "most important" and the desired CSLs reflect this business need.

Simulating solutions

Ideally, determining CSLs for holiday and promotion inventory combines both a mathematical and easily reproducible approach. To evaluate the impact of dynamic CSLs that incorporate buyer intuition into inventory policy, two types of simulations were tested.

One is a system dynamics model created in VenSim. The other model is a simulation run in RELEX, a forecast and replenishment software. The former allows users to adjust service levels throughout the year and immediately measure impact on product availability and inventory. It cannot, however, be used to create actual replenishment orders. The RELEX software allows for a wide variety of simulations using production data, and the results can be fed directly upstream.

Each simulation uses actual historical data for starting inventory position, forecasted demand, store orders, lead time, review time and standard deviation. The models then simulate the inventory levels through different CSL settings.

Based on their seasonal variability and dramatic changes in importance throughout the year, five items with complete records were selected for the system dynamics simulation. Each simulation ran for the maximum amount of time that data was available. Because the goal was to understand the long-term implications of the dynamic policy, the larger the data sets the better. For each item, the simulation tested the impact of using the standard deviation of demand versus the standard deviation of forecast error when calculating the safety stock levels.

Each item-level simulation within the system dynamics simulation used a lead time and a review time of seven days. These variables could be manipulated in the simulation if agreements with vendors changed from the standard 10 days. That's beneficial because in practice, vendor lead times can vary, and, when under pressure, orders placed whenever needed. When isolating the impact of dynamic CSLs, it was necessary to fix both the demand time and review time variables throughout the simulation. One final parameter was included in the simulation: Demand that could not be fulfilled directly from inventory was either lost and not backordered.

Different items were selected for the RELEX simulation due to the constraints of available data in the system, but the criteria remained the same. Using two years of historical sales data, items were examined with respect to their co-efficient of variation and the total movement. Any items that did not have at least 60 weeks of movement were removed from the selection process.

It's also worth noting that the CSL base case in the system dynamics model was fixed at a predetermined value. However, the RELEX simulations used the actual desired service levels from ABC segmentation. Items in each product category were categorized by demand as XYZ, respectively top 75%, middle 15% and bottom 10%.

The RELEX system set safety stock levels based on the standard deviation of forecast error for those items on promotion for more than 108 of the last 180 days. Forecast error was calculated daily at the item-location level, and 180 days were used to calculate standard deviation. For items not highly promoted, the safety stock calculation used the standard deviation of demand for the last 180 days because highly promoted items are more difficult to forecast and require additional safety stock.

Sixteen simulations were run in the RELEX system, each running for three different 120-day time periods. Simulations were broken into three groups:

1. the **base case** used all items and current system settings;

2. the **dynamic simulations** evaluated the impact of having a higher desired service level

during promotional time periods and XYZ segmentation when not promoted; and

3. the **extreme simulations** ignored the XYZ values and set all non-promoted items at a base service level of 80% and used a 96% CSL for promoted items.

Simulation outcomes

After each simulation, the inventory levels, item fill rate and lost sales were measured. These results were compared across the different methods of calculating standard deviation and among the fixed and dynamic CSLs.

The first test looked at the comparison of the standard deviation of demand to the standard deviation of forecast error. This was done because promoted items are typically more difficult to forecast, and typically require higher levels of safety stock to maintain high fill rates.

Setting safety stock levels based on the standard deviation of demand led to an average inventory reduction of 5% for four of the five items in the system dynamics simulation. On average across all items and tests, the fill rate was 1% lower using the demand calculation.

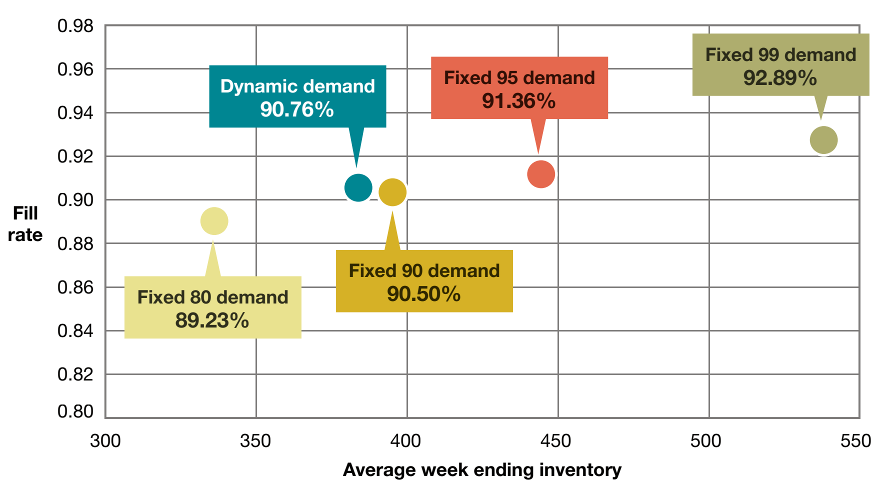
In the RELEX simulation, the top moving item had a significant inventory reduction when using the standard deviation of demand instead of forecast error. However, this resulted in a 14% reduction in product availability. In this case, the additional safety stock matched the importance of the item. For the two steady-moving items used in this simulation, using the standard deviation of demand instead of forecast error led to an inventory reduction while still maintaining the same product availability. In these simulations, items with high velocity or high variability benefited the most from using the standard deviation of forecast error.

The next set of simulations compared the dynamic, decision frame-based model with the baseline results. For all items, as anticipated, the highest fill rate was achieved by fixing the service level at 99% in the baseline simulation. However, this also resulted in the highest level of inventory. Using the dynamic, decision-frame based simulation actually reduced inventory by 24% compared to the base case while still maintaining 97% service level (see Figure 1). On average, the dynamic simulations based on the decision-frame model achieved fill rates greater than the base case where CSLs

FIGURE 1

Plot of average week ending inventory vs. fill rate for a specific item using the system dynamics simulations

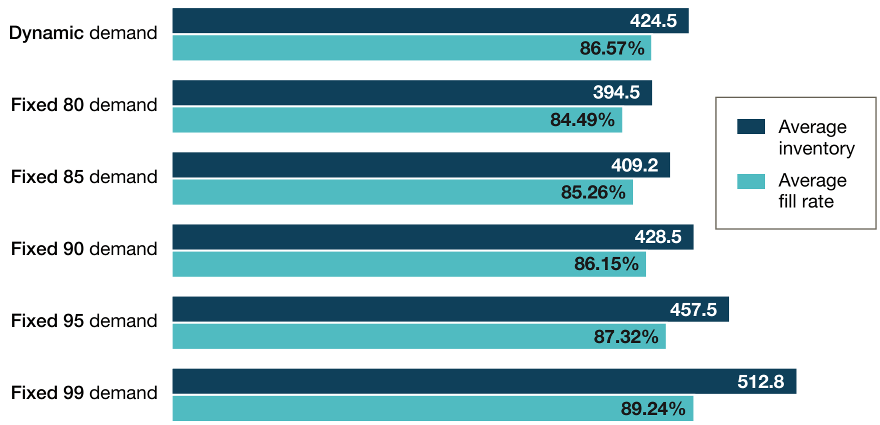
The blue dot shows a reduction in inventory with a higher fill rate than the base line fixed simulation.



Source: Authors

FIGURE 2

The average inventory positions and fill rates for all items in the system dynamics model simulation



Source: Authors

were fixed at 90% (see Figure 2).

Using RELEX as the simulation software, the dynamic model used XYZ service levels if the item was not promoted and a 98% service level when the item was on promotion. As expected, there was not a dramatic change in the highly promoted items, as the XYZ service level was already 95%. Across all items, the dynamic model raised product availability by 0.6% and inventory by 3.1% while reducing lost sales by 2.9%.

The goal of the next set of extreme simulations was to establish dynamic levels to produce the lowest level of inventory possible while maintaining a service level that was the same as or better than the baseline simulation. Through adjustments in the decision frame in the extreme simulations, overall inventory was reduced while maintaining the same service levels as the fixed policy using the Vensim simulation. The fixed policy forced items to carry high levels of safety stock when the business did not necessitate it. Adjusting the service levels to reduce inventory and maintain fill rates led to higher inventory during the important promotional times and lower overall inventory in the non-promoted times.

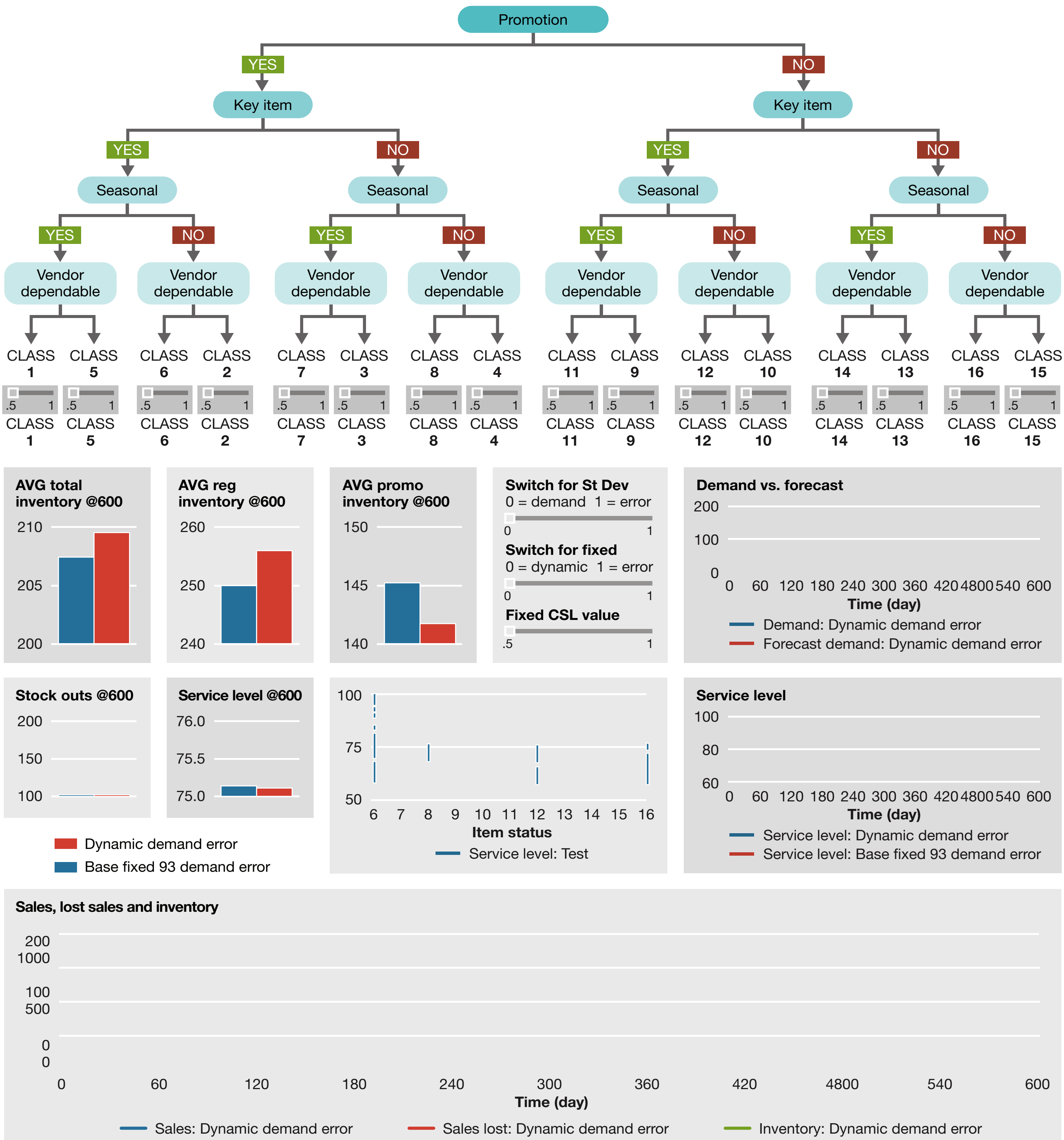
In the RELEX model, service levels were set before running each simulation. The next simulation tested an extreme scenario in which desired promotional CSLs were set at 96%, but CSLs at all other times were 80%. On items with many promotions, the service level decreased slightly (0.3% and 0.6%) while the overall inventory fell 5.3% and 5.1%, respectively. However, this reduction led to a 50% increase in lost sales. For the fast-moving item, this policy led to a significant inventory reduction (19.1%) with a 3.1% reduction in product availability. Depending on the importance of the item, the decrease in inventory justified the increase in lost sales.

What it all means

Traditionally, safety stock levels are fixed throughout the year based on a single criterion: Demand volume. However, these simulations demonstrate the advantages of dynamic CSLs and the value of aligning safety stock levels with shifts in food retail demand, which are often exaggerated by holidays and promotions. By establishing a safety stock framework that accommodates these realities, a retailer's supply chain can lower inventory levels and reduce manual intervention while maintaining

FIGURE 3

Operational dashboard used in the system dynamics model



Source: Authors

high service levels. In fact, this framework can be applied to any business that carries inventory of variable importance throughout a year—think bathing suits for the beach season or toys during the holiday season.

The system dynamics model creates value by providing immediate feedback on management decisions and visually representing the dynamics of a company's inventory policy. That makes it easy to understand how different variables in the model interact. The data necessary to run these simulations (historical forecasts, store orders, and item classifications) are typically available. This facilitates quick simulations that demonstrate the tradeoffs between service and inventory levels. Furthermore, this model provides insights into opportunities to reduce inventories while maintaining desired CSLs.

Other benefits include a better understanding of the dynamics of purchase orders and inventory levels. This helps decision makers to more precisely define optimum policies for the purchase order process. In addition, this model includes several key data points and parameters. These include the decision frame, standard deviation measures and output graphs as well as switches to adjust CSLs for a shift from a fixed to a dynamic inventory policy. (See Figure 3 for an overview of the model.)

The system dynamics model, however was limited in that its utility was strictly for simulation. Users could quickly test assumptions, but ultimately, these assumptions need to be implemented in an enterprise forecast and replenishment solution like RELEX. Building the simulations in Vensim allowed use to familiarize users with the underlying logic before implementing these changes in the software solution.

Dynamic CSLs particularly make sense when demand management groups are prone to disregard inventory policies due to fear of running out of stock. A dynamic policy counterbalances factors that typically lead to manual orders. Given that management teams provide the factors used to set the dynamic CSLs, this policy creates additional trust in the system and, ideally, reduces the need for manual interventions.

As business priorities change and buyer groups feel the need to deviate from a system, it is important to understand the underlying causes for deviations. Re-examining the decision frame and incorporating the new classification criteria can help realign buying practices with business priorities. A dynamic frame increases safety stock based on the importance of the item and reduces it when the item is less important. This was shown to reduce overall inventory and free up working capital.

It is, however, important to note that dynamic CSLs do not necessarily make sense in every business context. For example, there are certain external opportunities such as forward buys or limited product availability that may require a company to steer away from dynamic CSLs.

Finally, as with all inventory policies, it is important to remember that strong inputs lead to strong outputs. In other words, forecast accuracy is critical to maintaining high service levels. While a dynamic policy provides extra safety against demand variability, inaccurate forecasts will also lead to out-of-stocks. In the simulations in which a 99% CSL was desired, out-of-stocks still occurred due to forecast inaccuracies. When there is high variability in forecasts, it makes sense to use the standard deviation of forecast error as an additional buffer in safety stock.

There are also limits to dynamic CSLs. They address service level variations for only one item at a time. Furthermore, the optimal tradeoffs between inventory and service are up to the user. An area for future research is applying these dynamic techniques across entire segments of items. Instead of fixing service levels by segment, as is typically done, a dynamic framework could be assigned to each segment. The service levels for each segment could be assigned through an optimization in which the highest service level is achieved given a predefined budget for inventory. This could be a preferred technique to the traditional ABC methods.

Dynamic CSLs provide unique value because they offer decision makers with input to establish the best levels of safety stock by ensuring that rules are followed and inventory levels are correct. By dynamically setting service levels, demand managers can adapt to changing business needs and still ensure that inventory is in the right place at the right time in the right quantity.

A SPECIAL SUPPLEMENT TO:
SUPPLYCHAIN MANAGEMENT REVIEW

TOP 50 THIRD-PARTY LOGISTICS

Today's marketplace not for the faint of heart

Leading industry analysts maintain that in the current volatile business environment, an increasing number of logistics service providers are being forced to take dramatic action to generate positive impact rapidly—or risk going out of business.

BY **PATRICK BURNSON**, DIGITAL EDITOR

While compiling its annual list of Top 50 third-party logistics (3PL) players, Armstrong & Associates (A&A) always seeks to find a few leading trends that indicate where the market is heading on both the provider and shipper sides around the world.

After working on the lists and the supporting report, Evan Armstrong, president of the consultancy, suggests to shippers that quick, tactical solutions should not be relied upon at this moment in time. Indeed, he maintains that 2020 will remain a year of "strategic crisis" for logistics managers aiming for a

Continued on page 54

Armstrong & Associates Top 50 U.S. 3PLs

(as of May 14, 2020)

2019 Rank	Third-party Logistics Provider (3PL)	2019 Gross Logistics Revenue (USD Millions)*
1	C.H. Robinson	15,309
2	XPO Logistics	10,287
3	UPS Supply Chain Solutions	9,302
4	J.B. Hunt (JBI, DCS & ICS)	8,788
5	Expeditors	8,175
6	Kuehne + Nagel (Americas)	7,060
7	DHL Supply Chain North America	4,364
8	Ryder Supply Chain Solutions	3,969
9	Hub Group	3,668
10	Coyote Logistics	3,600
11	Total Quality Logistics	3,394
12	DSV Panalpina (Americas)	3,225
13	Burris Logistics	3,100
14	Transplace	3,000
15	Schneider Logistics & Dedicated	2,650
16	Penske Logistics	2,600
17	GEODIS North America	2,540
18	FedEx Logistics	2,310
19	MODE Transportation	2,300
20	Transportation Insight	2,210
21	Echo Global Logistics	2,185
22	DB Schenker North America	2,178
23	Landstar	2,173
24	NFI	2,130
25	CEVA Logistics (Americas)	1,950
26	Americold	1,775
27	Ingram Micro Commerce & Lifecycle Services	1,750
28	Worldwide Express/Unishippers	1,675
29	BDP International	1,552
30	GlobalTranz Enterprises	1,532
31	Werner Enterprises Dedicated & Logistics	1,524
32	Lineage Logistics	1,440
33	Knight-Swift Transportation	1,395
34	Universal Logistics Holdings	1,260
35	syncreon	1,203
36	TransGroup Global Logistics	1,200
37	Radial	1,082
38	Odyssey Logistics & Technology	1,018
39	APL Logistics (Americas)	1,010
40	Ruan	1,002
41	Crane Worldwide Logistics	916
42	OIA Global	876
43	Nolan Transportation Group	875
44	Nippon Express (Americas)	855
45	Neovia Logistics	835
46	Pilot Freight Services	829
47	Radiant Logistics	813
48	Cardinal Logistics Management	805
49	SEKO Logistics	800
50	U.S. Xpress	797

*Revenues are company reported or Armstrong & Associates, Inc. estimates and have been converted to US$ using the average annual exchange rate in order to make non-currency related growth comparisons.

SPECIAL REPORT

TOP 50 3PLs

State of the 3PL Market

Armstrong & Associates Top 50 Global 3PLs

(as of May 14, 2020)

2019 Rank	Third-party Logistics Provider (3PL)	2019 Gross Logistics Revenue (USD Millions)*
1	DHL Supply Chain & Global Forwarding	27,302
2	Kuehne + Nagel	25,875
3	Nippon Express	19,953
4	DB Schenker	19,349
5	C.H. Robinson	15,309
6	DSV Panalpina	14,355
7	Sinotrans	10,549
8	XPO Logistics	10,287
9	UPS Supply Chain Solutions	9,302
10	J.B. Hunt (JBI, DCS & ICS)	8,788
11	Expeditors	8,175
12	CJ Logistics	7,173
13	CEVA Logistics	7,124
14	Hitachi Transport System	6,472
15	DACHSER	6,408
16	GEODIS	6,379
17	Toll Group	6,335
18	Damco/Maersk Logistics	5,965
19	GEFCO	5,365
20	Kerry Logistics	5,274
21	Bolloré Logistics	5,180
22	Kintetsu World Express	5,067
23	Yusen Logistics/NYK Logistics	4,410
24	Agility	4,122
25	Ryder Supply Chain Solutions	3,969
26	Hub Group	3,668
27	Coyote Logistics	3,600
28	Imperial Logistics	3,507
29	Total Quality Logistics	3,394
30	Burris Logistics	3,100
31	Transplace	3,000
32	Hellmann Worldwide Logistics	2,974
33	Schneider Logistics & Dedicated	2,650
34	Sankyu	2,613
35	Penske Logistics	2,600
36	FedEx Logistics	2,310
37	MODE Transportation	2,300
38	Transportation Insight	2,210
39	Echo Global Logistics	2,185
40	Landstar	2,173
41	NFI	2,130
42	Mainfreight	2,038
43	Groupe CAT	1,925
43	Fiege Logistik	1,925
44	Americold	1,775
45	Ingram Micro Commerce & Lifecycle Services	1,750
46	ID Logistics Group	1,737
47	Worldwide Express/Unishippers	1,675
48	APL Logistics	1,630
49	BDP International	1,552

*Revenues are company reported or Armstrong & Associates, Inc. estimates and have been converted to US$ using the average annual exchange rate in order to make non-currency related growth comparisons.

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sustainable business plan with their 3PL partners.

"With the current uncertain business environment, an increasing number of logistics providers are being forced to take dramatic action to generate positive impact quickly—or risk going out of business," says Armstrong, adding that, during the first phase of a strategic crisis, a business is no longer able to compete effectively.

In the new A&A report, "Increasingly Strategic: Trends in 3PL/Customer Relationships," Armstrong and his analysts observe a shift from initial 3PL sales strategies emphasizing relationships with large Fortune 500 accounts. Most 3PLs, in fact, are now also pursuing smaller accounts, which offer the potential for more strategic relationships with better profit margins.

However, trends do indicate continued awareness of the benefits of using 3PLs among Fortune 101 to 1,000 companies, and according to Armstrong, this growth should hold over the foreseeable future. The overall U.S. 3PL market growth was 15.8% in 2018, the highest it has been since 2010, followed by a decline of -0.3% in 2019. Taking the last decade into consideration, 3PLs have developed business at an average of two to three times the rate of growth in the U.S. economy.

"Transportation management continues to rank first among all regions around the globe," observes Armstrong. "Third-party providers in the Asia-Pacific region provide customers with a significant proportion of international services, while the Europe, Middle East and Africa-based 3PLs provide a greater proportion of warehousing, value-added, and integrated solutions. Meanwhile, North American services are typically transportation management, warehousing, and value-added services." (See sidebar.)

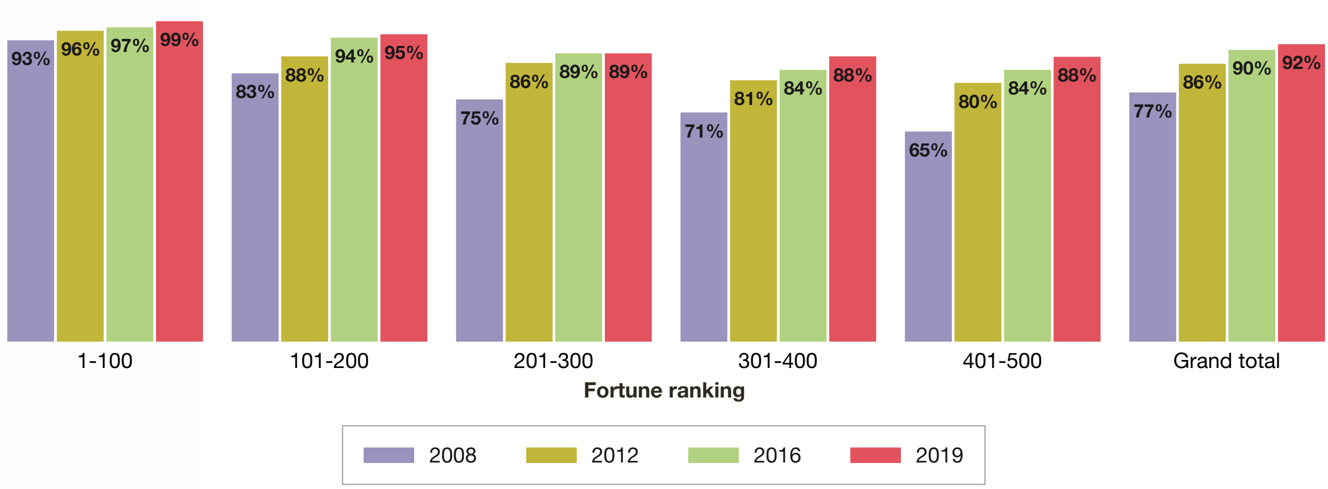
Trade tensions and pandemic

Cathy Morrow Roberson, founder and head analyst for Logistics Trends & Insights LLC, a boutique market research firm that specializes in global supply chains, says that she would be surprised to hear of any major 3PL *not* affected by the trade tensions between the United States and China over the course of 2019.

"Freight forwarding and intermodal volumes, on average, declined last year," says Morrow Roberson, "and those 3PLs that didn't have a balanced portfolio of services probably were more negatively affected."

Regarding COVID-19, she says that so far it looks like much of the demand for goods is coming from larger shippers as many small- to

Domestic Fortune 500 use of 3PLS 2008–2019



Source: Armstrong & Associates

medium-sized businesses struggle to reopen.

"As manufacturing slowly recovers, there will be some pick up in 3PL activity, such as warehousing and distribution," says Morrow Roberson. "Growth in e-commerce logistics will also continue as consumers, accustomed to ordering while confined to homes, will continue to order items online. However, the COVID-19 impact will hit 3PLs' profits for at least the first half of the year, if not longer."

Morrow Roberson also notes that tight air cargo capacity has resulted in some modal changes. For example, rail between Asia and Europe. DHL has added additional rail containers to meet demand for this solution. "Some providers are also utilizing trucking between Asia and Europe," she says. "Multimodal options such as sea/air are also being used more as well as ocean for goods that usually move by air."

For domestic players, she feels that while cross-border activities continue, there may be more considerations for onshoring. "As we move past COVID-19 particularly, the pharmaceutical

Armstrong digs deeper into the research

Armstrong & Associates provides shippers with a number of key takeaways on the state of the industry in its new report "Increasingly Strategic: Trends in 3PL/Customer Relationships." In this exclusive interview, Evan Armstrong expands upon its findings.

***SCMR:* What were the main surprises to surface in your research this year?**

Evan Armstrong: We're actually surprised by the limited impact COVID-19 has had on 3PL operations staffing. It seems to have disrupted China from a staffing perspective much more than we are seeing in the United States.

***SCMR:* Were any particular 3PLs hurt by the trade tensions between the United States and China in 2019?**

Armstrong: The U.S. economy is tightly interconnected with China, and so are its supply chains. The import tariffs have been a continued drag on international trade, the growth of 3PLs and other U.S. businesses as well as the overall U.S. economy. The only bright spot for 3PLs has been on the import compliance side of international transportation management (ITM) operations where there has been increased demand for expertise.

***SCMR:* While it's probably too early to tell, what impact will COVID-19 have on global and domestic 3PLs?**

Armstrong: Domestically, the first quarter of 2020 was okay for 3PLs after a soft 2019 that saw overall U.S. gross revenues decline slightly. The first quarter saw some extra demand and resultant revenue increases within the food and grocery, consumer, Internet retailing, and technological vertical industries as products were hoarded by consumers and computers and office equipment were purchased to adhere to stay-at-home rules. The second quarter has seen about a 15% drop in domestic transportation management (DTM), and 3PL segment gross revenues as volumes have dropped off across all modes.

***SCMR:* Have you seen any major shifts in modal decisions by global 3PLs? More ocean, less air, for example?**

Armstrong: The focus is still on meeting product demand using the most economical mode, but strong spikes in consumer B2C business and healthcare related spending drove procurement toward airfreight.

***SCMR:* Finally, when will the barriers to entry finally come down to permit new players to enter the "Top 50" marketplace?**

Armstrong: To break into the Top 50 requires a well thought out strategy to drive organic business growth as well as inorganic growth through merger and acquisition. It's important to know your strengths in terms of value proposition, service offering, customer satisfaction, vertical industry expertise, and execute an operational model that builds upon your strengths and fills gaps to overcome weaknesses.

Organizational alignment to focus on customer needs and optimizing service performance is critical to grow organically. If you're a customer of a 3PL and it isn't consistently communicating its value to you in terms of performance or cost savings, then it may be time to look for other options. As they say, every 3PL's best customer is another 3PL's best prospect.

—Patrick Burnson, executive editor

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and healthcare supply chain may be reconfigured to meet demands made by U.S. shippers," Morrow Roberson adds.

Meanwhile, cold chain will continue to be a vibrant 3PL niche for similar commodities, says Morrow Roberson. "This sector is a strong one for acquisitions in which Kuehne + Nagel and Panalpina [acquired by DSV] are playing leading roles," she says. "Air cargo demand for fresh produce, meats, vegetables and flowers has been on the rise in recent years due to a growing middle class in China as well as growing demand in other Asian countries, the Middle East and elsewhere."

Morrow Roberson concludes by noting that the ability for air cargo to move perishable goods from one place to another quickly is a key driver of this cargo growth, and in some cases, it's replacing profitable electronics volumes that peaked by 2010 for air cargo providers.

"In addition, those 3PLs with a strong pharma/healthcare emphasis such as UPS and DHL also will see cold chain services grow," says Morrow Roberson.

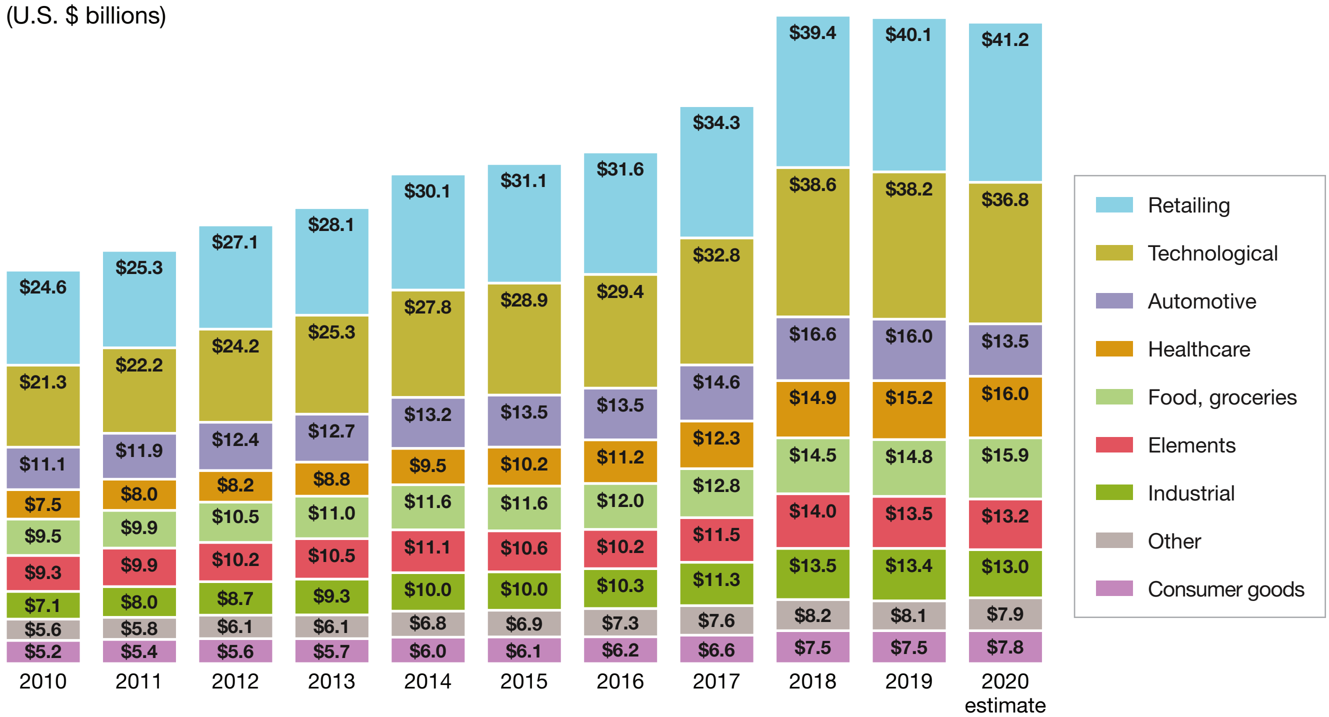
The impact of e-commerce

While stay-at-home orders imposed by government leaders may have challenged many logistics managers, one prominent player in the marketplace has found a way prosper within the "new normal" mandate.

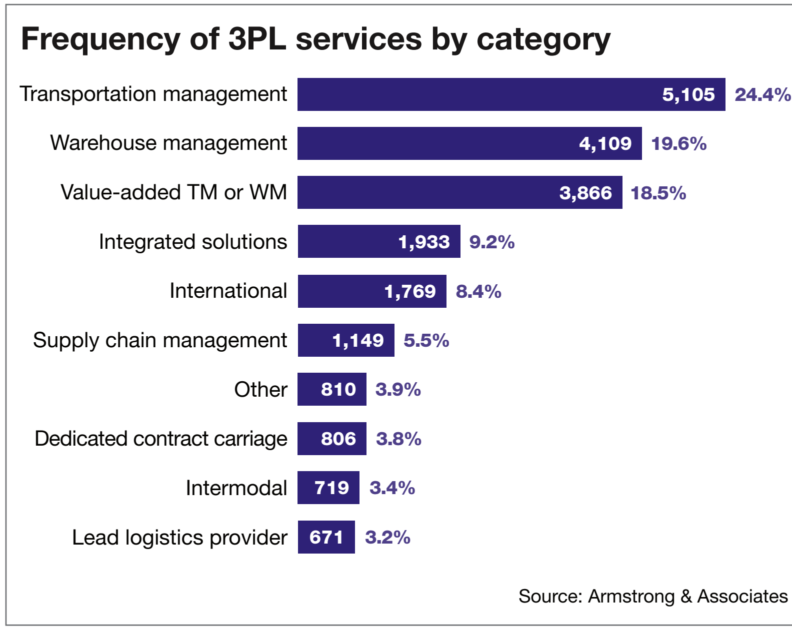
El Segundo, Calif.-based 3PL Central is a warehouse management systems (WMS) leader that recently shared data indicating unprecedented growth in order volume from 3PLs supporting e-commerce since the lockdown. Analyzing proprietary data from its customer base, the provider has seen an 81% increase in order volume over the same time last year and the highest order volumes per 3PL ever—on par with Black Friday in 2019.

As it processes in excess of one million orders

3PL revenues by industry from 2010–2020 (estimate) for the Fortune 1000 domestic
(U.S. $ billions)



Source: Armstrong & Associates



per week, 3PL Central shippers may indeed offer a relevant barometer for the growth of the 3PL warehousing market. Out of the top 100 shippers, the average growth rate per 3PL exceeds 61%, with more than 80% experiencing growth. Of the total 3PLs using its WMS, 45% have experienced growth.

Acute areas of growth include those 3PLs fulfilling e-commerce orders for essential goods and nutraceuticals. However, those 3PLs focusing purely on B2B fulfillment of non-essential items have been the hardest hit.

David Miller, general manager of platform services at 3PL Central, says many industry players are dealing with disruption in a positive way. "We're seeing 3PLs pick up a lot of business from Amazon fulfillment centers as that inventory is being displaced," he says. "Amazon is prioritizing household items, opening up a lot of demand and opportunity for other third-party warehouses to fill additional consumer demand."

According to Miller, top providers are also discovering how essential their businesses are. Obviously med-tech and food/cold storage has been an imperative part of the essential supply chain, but other items such as electronics and communication equipment, literature and learning supplies, arts and crafts have all become critical for continued education.

"We've identified four trends across the top 3PLs we work with, including driving warehouse space efficiency to accommodate more inventory on hand," says Miller. "The 3PLs responding to this increased demand have to act quickly to support unprecedented volumes or risk losing customers in this critical time."

Miller believes that there will also be a resurgence of manufacturing in the United States and continued reduction of Chinese manufacturing. "This will lead to reduced ocean freight for years to come, and potentially increase the needs of domestic intermodal transportation," he says. "In fact, a lot of ocean capacity is tied up due to closed ports, and ocean rates are starting to spike in certain lanes."

Finally, he sees freight recovery happening in the air sector faster than personal travel.

"This demand should put more planes back in the air at more competitive freight rates—compared to ocean—than before. I expect to see all of these sectors recover in the long term, but for 3PLs, the next couple of years will be…interesting."

—Patrick Burnson is the digital editor of Supply Chain Management Review

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Building resilient supply chains post-COVID-19

By Per Kristian Hong and Arun Kochar

Per Kristian Hong and Arun Kochar are partners in Kearney's Operations and Performance Practice. They can be reached at per.hong @tkearney.com and Arun.Kochar @kearney.com.

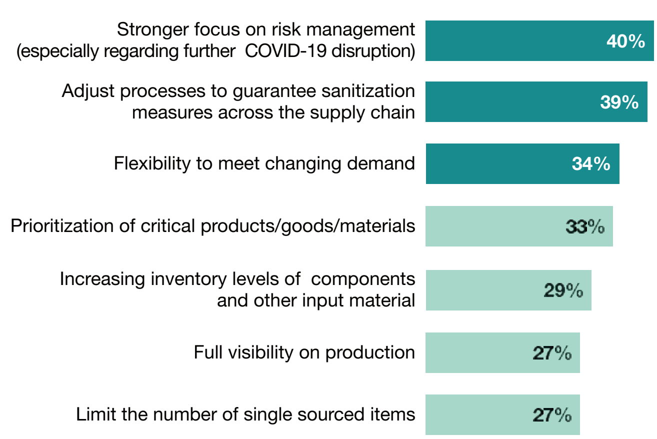
The COVID-19 pandemic is disrupting global supply chains, with consequences for businesses, consumers and the global economy. Operations leaders are scrambling to respond to urgent questions about how to protect their employees, ensure supply security, mitigate the financial impact, address reputational risks and navigate market uncertainty. While many companies, institutions and governments have engaged in business continuity and risk management planning exercises in recent years, traditional risk management activities have largely centered on reacting to localized events pertaining to a specific geography or sector. The latest global supply disruptions underline the need for a new paradigm to develop supply chain resilience.

Even before the COVID-19 pandemic, supply chains were highly stressed. For decades, companies sought to aggressively optimize cost competitiveness through economies of scale, often by moving activities to lower-cost labor locations—frequently at the expense of other critical supply chain attributes like flexibility and agility. The most recent global supply chain supply continuity and cost challenges resulting from COVID-19, however, have laid bare many of the vulnerabilities and fragility brought about by this strategy and approach.

Kearney, in collaboration with the World Economic Forum, recently interviewed and surveyed more than 400 global operations and supply chain management C-suite executives on their responses to the COVID-19 crisis to deepen our insights on how they have been ensuring business continuity, protecting employees and implementing their strategies to succeed in the post-pandemic era. Forty-seven percent of those we surveyed indicated a need to overhaul their manufacturing and supply networks to increase future resilience and nearly two in five planned to place a greater focus on risk management going forward to become more flexible when it comes to reacting to future disruption. Figure 1 presents the top supply chain priorities for respondents coming out of the pandemic.

FIGURE 1

Top supply chain priorities for companies as a result of the COVID-19 crisis



Source: Source: Kearney, COVID-19 survey (as of April 10)

It seems clear that designing supply chain processes and outcomes around cost-competitiveness is no longer sufficient; companies will need to reorient toward approaches that embrace "risk-competitiveness" to ensure resilience moving forward. While there are many factors involved, achieving resilience will require that the next generation of supply chain winners move away from the traditional competitive advantages derived from economies of scale toward a greater emphasis on what we term "economies of skill."

Developing economies of skill

The advent and adoption of Industry 4.0 technologies such as AI-enabled forecasting, data analytics, robotics and VR design have made it both desirable and easier to shift supply chains closer to consumers. While corporations have made significant investments to digitize and automate supply chains, technology alone does not guarantee success. Sustainable supply chain success entails significant rethinking and reskilling to develop a truly adaptive and resilient supply chain. This makes innovation in education and training crucial.

There is an urgent need to further develop people's ability to engage in creative thinking and to become more agile, as opposed to the traditional emphasis on imparting accepted knowledge. To make global supply chains more intrinsically adaptive (as is clearly essential in times of sustained disruption), companies must pursue more open, holistic innovation through networks of research, product development, marketing and process development, rather than innovating through isolated internal groups.

Paramount to developing a holistic mentality across the organization that transcends silos is an ability to ensure end-to-end connectivity and capabilities to act, not unlike the way in which the human central nervous system functions. People's collective intuition, ingenuity and creativity are essential to operating in this manner. Reskilling is needed to develop people's abilities to scan the landscape for a range of data sources, quickly consider how this data signals potential disruptions, draw actionable insights and then ultimately incorporate those insights into operational decision making.

We helped reskill one consumer healthcare manufacturer's supply chain team as part of a broader collaborative network redesign effort aimed at breaking down silos and improving supply chain responsiveness to customer needs and market conditions. Team members from the plan, source, make and deliver groups underwent action learning and hands-on coaching to help develop and deepen their skills and capabilities, which proved to be a key success factor for the supply chain's redesign.

Agility is a key capability that allows us to proactively explore and adapt to new realities, which is essential to achieving economies of skill across the supply chain. A combination of skill sets and an agile mindset are needed to achieve agility of thought and action. The agile methodology for project management has been successfully applied in areas like collaborative software development for years, as it values individuals and interactions more than tools and processes and encourages responding to change rather than dogmatically following plans and timelines. Now, companies that have trained their people in agile thinking skills are successfully applying them to increase the responsiveness of their supply chains.

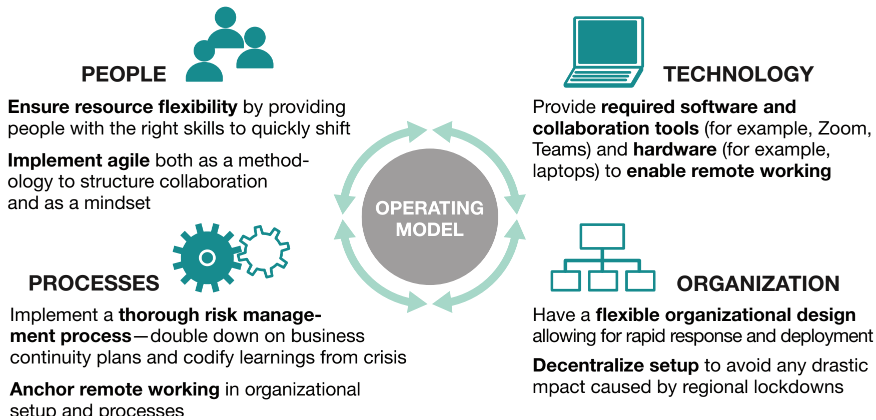
The agile methodology emphasizes relationship and collaboration skills, which have critical applications in areas like supplier relationship management. During the pandemic, forward-thinking organizations have intensified their collaborations with key supply sources, bringing operational and financial benefits to both parties. The crisis has also seen people both within and across industries developing new strategic partnerships that are fostering knowledge sharing, exchanges around manufacturing and supplier capacities and even joint innovations. Collectively, this activity is resulting in improved supply chain resilience, agility and efficiency.

Building supply chain resilience through economies of skill

Coordination within companies and externally across the combined supply chain of business partners is critical to building resilient value chains. Collaborative operating models drive this coordination and cohesion, enabled by technologies like cross-functional "control towers" that gather data and provide visibility into potential blind spots to help people make decisions swiftly. This all-encompassing view helps to overcome capacity limitations and other roadblocks that can lead to supply shortages. A robust combination of new technology, processes and analytics has helped supply chain team members understand the trade-offs that have to be made in volatile times like these, and make informed choices. Figure 2 provides an overview of some key considerations for developing more resilient supply chain operating models.

FIGURE 2

Key considerations for future resilience-focused supply chain operating models



The increased degree to which work will be performed remotely moving forward introduces some challenges that will necessitate additional reskilling for supply chain personnel. Remote trainings and operational excellence activities are already happening at some companies. Yet some supply chain areas require a significant workforce presence even with ever-increasing amounts of automation, including distribution and manufacturing. Technologies like robotics, IoT and virtual and augmented reality are helping bake resilience into critical inspection, maintenance and repair work on manufacturing and packaging lines.

Collaboration and relationship skills can add to supply chain resilience by helping with supply assurance. In a manufacturing crunch, companies can leverage relationships and share intellectual property like design files and recipes so that other companies can produce goods on their behalf when excess capacity allows. This sort of practice is especially critical when crises reduce the existing manufacturing base or there is a sudden increased demand for critical products; we have seen examples of this recently with cross-industry collaborations to produce personal protective equipment such as masks, face shields, hospital wear and even ventilators during the current pandemic.

Future-proofing through people-centric supply chains

Our current crisis period offers useful learnings to strengthen supply chains. In our recent co-authored research report with the World Economic Forum, we describe a number of additional trends that may well further disrupt global supply chains. These trends range from emerging technologies to resource scarcity pockets evolving from the accelerating global climate emergency to the reconfiguration of globalization, which has resulted in escalating trade tensions. Projections in this study indicated a worst-case potential global value loss of up to 40% and best-case potential value gain of more than 70% across a range of possible scenario outcomes. Facing up to these disruptions requires new approaches to ensure an orderly, inclusive and sustainable transition.

The most recent COVID-19 experience emphasizes how companies have responded in a people-centric fashion by seeking to protect them and tend to their health and well-being at essential workplaces and at home. Now more than ever, people are essential to building world-class supply chain capabilities and to making critical, timely decisions.

Beyond the company—beyond even the extended ecosystem of partners—supply chain resilience also brings societal advantage through united approaches that come about through collaborations that get things done, such as speed up the production and delivery of essential supplies. Moving forward, the lessons from our current experiences must be captured and applied in an adaptive fashion to overcome new challenges as proactively as possible.

[1] *The full report, "How to rebound stronger from COVID-19: Resilience in manufacturing and supply systems," is available online at http://www3.weforum.org/docs/WEF_GVC_the_impact_of_COVID_19_Report.pdf.*

Supplier risk management in the spotlight

Although organizations have adopted key risk management practices, they need a more robust program.

By Marisa Brown, senior principal research lead, Supply Chain Management, APQC

Marisa Brown is senior principal research lead, supply chain management, APQC. She can be reached at mbrown@apqc.org.

As the world continues to adjust to the "new normal" brought about by global disruption, organizations must consider the lessons learned from the impact of the pandemic on the supply chain. In this case, widespread shutdowns made a sudden, dramatic impact on many suppliers and the availability of components and other materials. Sourcing, procurement and purchasing professionals are often the first responders in such instances. However, the risk management practices in place at an organization determine whether procurement and purchasing staff have the tools needed to adequately and efficiently mitigate supplier risk.

APQC has gathered insights on supplier risk management as part of its Open Standards Benchmarking research focused on procurement. As part of a global survey, APQC asks respondents from various industries to indicate their adoption of key supplier risk management practices. The findings of this research indicate strength in the area of risk management governance, but weakness related to process and enabling technology.

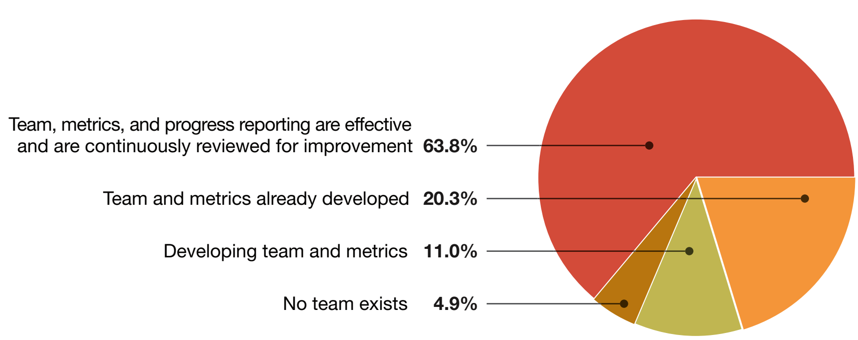
Clear governance

The good news is that in one area, organizations have clearly developed practices for supplier risk management. In 89% of organizations, procurement is responsible for executing operations related to third-party risk management to a moderate or very great extent. Having clear owners of risk management means that this group has the full scope of information gathered by the organization, rather than sharing responsibility with other groups. Another benefit is that, because they are focused on addressing supplier risk, procurement professionals can negotiate risk management terms into vendor and supplier contracts.

As shown in Figure 1, APQC's research also finds that 64% of organizations have a highly developed risk governance team for procurement processes. For this group, their team, metrics and progress reporting are not only effective, but are also continuously reviewed for improvement.

FIGURE 1

Risk governance teams for procurement processes



Source: APQC

The 64% of organizations that continuously review their risk governance team, metrics and progress reporting are focused on remaining nimble in the face of uncertainties across the world. Not satisfied with simply having their governance run effectively, they look for opportunities to improve and adapt to the changing business landscape. These organizations can therefore adjust as needed and remain resilient when changes occur or new risks appear.

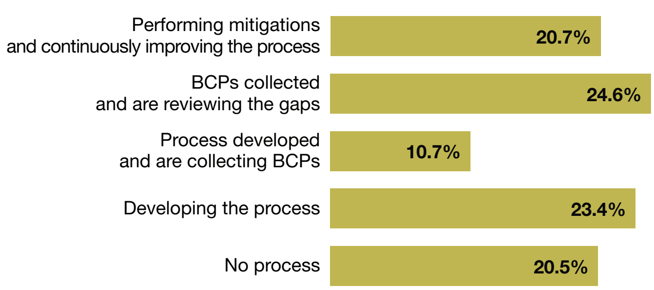
When it comes to supplier risk management, organizations have clear ownership as well as flexibility and efficiency of governance. However, the maturity of their risk management begins to break down with regard to process and technology.

Developing process

As part of its research, APQC asks organizations to indicate the maturity of their processes to collect and review the business continuity plans of their suppliers. Overall, organizations have room for improvement. As shown in Figure 2, only 21% of organizations are at the highest maturity level, meaning they are not only collecting their suppliers' business continuity plans, but are also performing mitigations and continuously improving their processes.

FIGURE 2

Maturity of process to collect/review suppliers' business continuity plans



Source: APQC

APQC's data indicates that 23% of organizations are still determining their process for collecting and reviewing these plans, and 21% have no process at all. Further, 11% collect supplier plans but do not act on them. A majority of organizations are clearly at a disadvantage when it comes to assessing and addressing the business continuity of their suppliers. These organizations may have plans in place for disruptions directly affecting their facilities, but they need visibility into how supplier disruptions can affect their business.

It is also worth noting that mistakes or lack of planning by suppliers can have a ripple effect. In consumer-focused industries, customers often do not differentiate between a company and its suppliers. A disruption in supply can lead to disapproval and reduced trust by consumers, even if the company is not directly responsible.

The organizations at the highest maturity level regularly perform mitigations based on their suppliers' continuity plans and continuously improve their process for reviewing supplier risk. For these organizations, it is a matter of when, not if, the next disruption will occur. By keeping an eye on potential risks, these organizations remain flexible against sudden changes.

Technology support

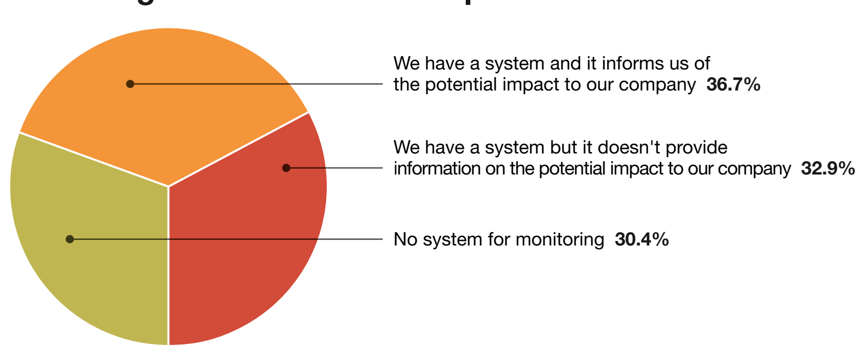
APQC finds that there is a lag in adoption of technology that supports monitoring for supply chain disruptions and capturing risk profiles. As Figure 3 shows, almost two-thirds of organizations surveyed do not have a system for continuous monitoring for and notification of global supply chain disruptions.

The use of such systems provides organizations with a look at big-picture risk. The 30% of organizations without a monitoring system will only be able to react to a disruption once it has already happened, resulting in critical time lost when finding a resolution. Even those organizations that have implemented a system to identify disruptions but lack a way to identify the potential impact on the company are at a disadvantage. These organizations may be able to identify a potential risk, but they do not have visibility into the event's impact, leaving them unable to take appropriate action.

Another system organizations use to address risk is one that provides a risk profile of suppliers, materials, supplier manufacturing sites, categories and products. These systems give organizations a comprehensive look

FIGURE 3

System for continuous monitoring/notification of disruptive events



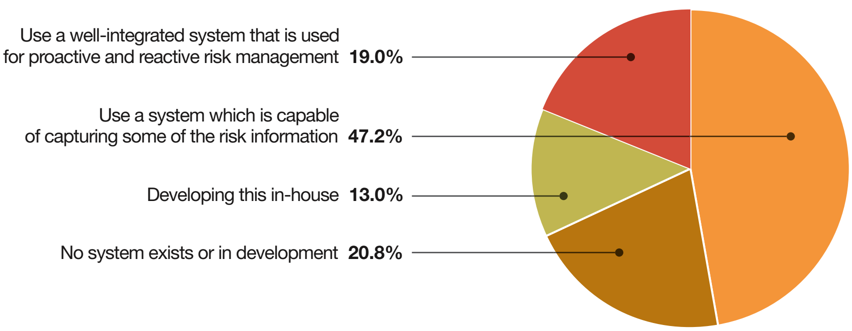
Source: APQC

at where components come from, as well as potential disruption risks. They provide organizations with the advantage of having a risk profile targeted to their operations.

Yet many organizations surveyed by APQC lag when it comes to adopting robust risk profile systems. As shown in Figure 4, one-third of respondents are not using one of these systems at all—either because they have no plans for one or because they are in the process of developing one in-house.

FIGURE 4

Use of electronic system for risk profiles



Source: APQC

As with other risk management efforts, having little to no risk profile data leaves organizations vulnerable in the event of a disruption. Without insight into their suppliers' operations, these organizations will be much slower to react to unexpected events. Those organizations using a system that supports both proactive and reactive risk management are much better positioned to address risk. Rather than losing time reacting to an issue they could have foreseen, they can address issues before they become problems and focus efforts on shortening response times to unexpected disruptions.

Be prepared for the future

Although organizations are prepared to address risk from a governance standpoint, they lack the robust technology needed to support risk identification and mitigation. Without a clear picture of potential risks and their impact on the business, organizations are unable to be proactive and lose crucial time when they must respond to a supply chain disruption. If time is money, then these organizations are losing money from their slow reaction.

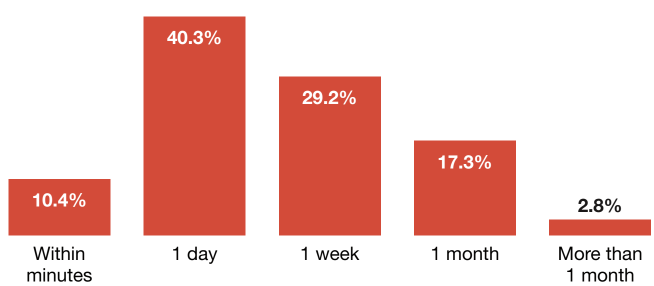
As shown in Figure 5, the largest group of organizations in APQC's research take one day to identify affected materials, sites, commodities and products when a supply chain disruption occurs. Nearly 30% of organizations take one week. Needing this much time (or longer) can be crippling for a business.

Procurement has a mandate to take the lead in supplier risk management, but a robust risk management program requires a multifaceted approach. Organizations must collect and track their suppliers' business continuity plans to ensure that these key partners are doing what they can to address their own risk, as well as meeting expectations set by the buyers.

In addition to risk mitigation through supplier relationships, organizations must adopt technology that can closely monitor the risks posed by suppliers, as well as potential disruptions in the broader business landscape. Given the various natural disasters and geopolitical disruptions of recent years, as well as the uncertainty caused by COVID-19, organizations must take steps to better anticipate disruptions and mitigate the risk from their suppliers. To do otherwise leaves them vulnerable to significant losses of time, money and customer trust.

FIGURE 5

Time to identify affected materials/sites/commodities/products after a disruption



Source: APQC

About APQC

APQC helps organizations work smarter, faster, and with greater confidence. It is the world's foremost authority in benchmarking, best practices, process and performance improvement, and knowledge management. APQC's unique structure as a member-based nonprofit makes it a differentiator in the marketplace. APQC partners with more than 500 member organizations worldwide in all industries. With more than 40 years of experience, APQC remains the world's leader in transforming organizations. Visit us at apqc.org and learn how you can make best practices your practices.