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JULY/AUGUST 2021

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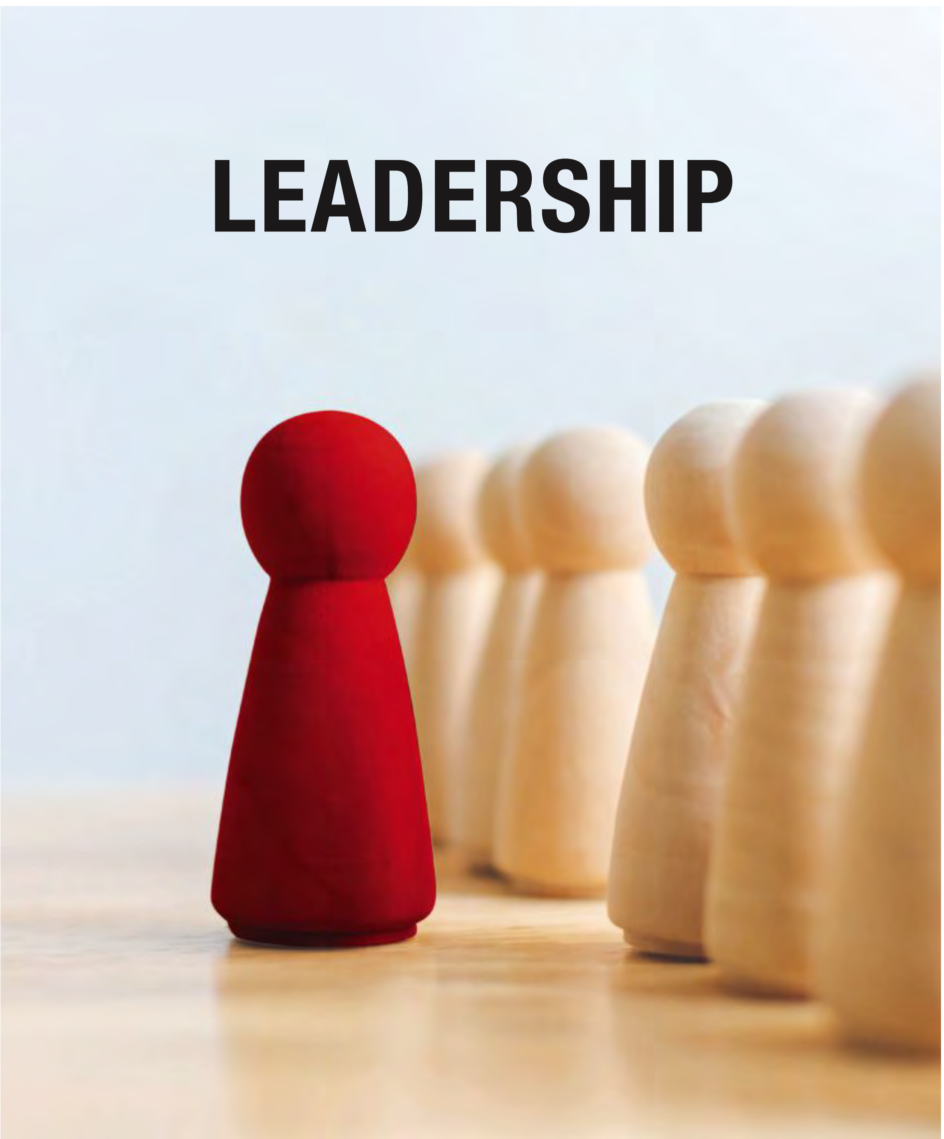

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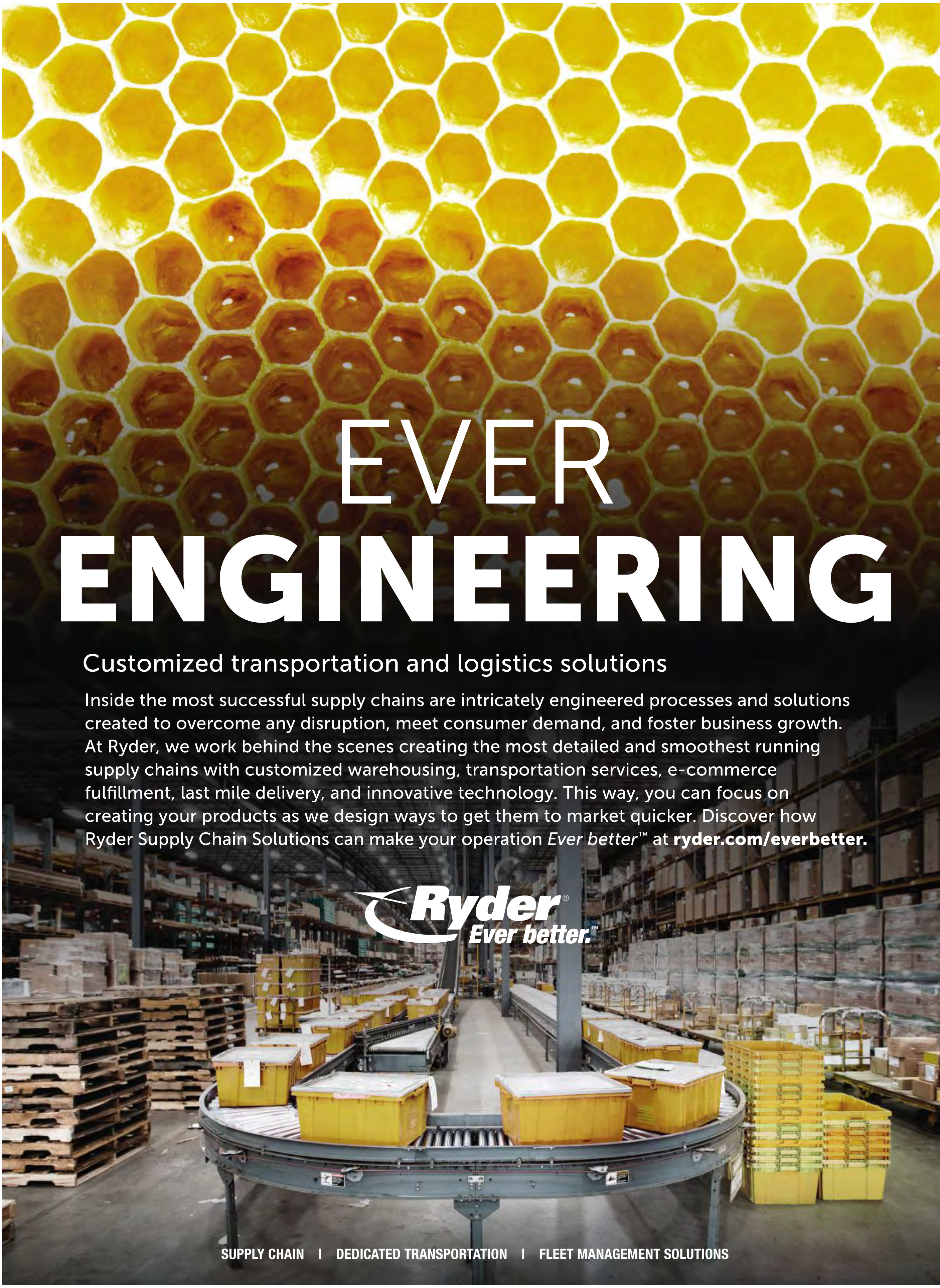
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Leadership matters

We all know the old saying: "When the going gets tough, the tough get going." It has been repeated so often it's cliché. I'd like to suggest a variation: "When the going gets tough, leadership matters."

To say that supply chains have had a tough time of it would be an understatement. Despite the positive vaccine news here in the United States, global supply chains are not out of the woods yet. As we know, India is both a significant source of supply and a mess; there are credible reports of new variants and outbreaks in China, accompanied by the threat of targeted shutdowns; and the *Wall Street Journal* reports that Vietnam, the China Plus One destination for many supply chain managers, is now experiencing COVID outbreaks and shutdowns. That doesn't begin to touch on the UK's struggle with Brexit; the growing number of cyberattacks or the shortages of seemingly everything. In a recent podcast, Hannah Kain, the CEO of the global management firm ALOM, predicted that we're going to "muddle through" for another three years.

But, in spite of all of that, the best supply chains are finding ways to perform and deliver, even with one hand tied behind their backs. The difference: Leadership.

Leadership was the theme of my interview of Bobby Burg, the chief supply chain officer for Southern Glazer's Wine & Spirits, one of the world's largest distributors of alcoholic beverages. Consider this: In a three-week period last March, 45% of Southern Glazer's customers shut down as one state after another closed bars, restaurants, cruise ships and other venues where alcoholic drinks are sold. At the same time, demand for alcohol for consumption at home soared. As Burg told me, the two channels have very different packaging and distribution requirements. Yet, the team at Southern Glazer's found ways to adjust on the fly and keep the goods flowing. That's leadership.

Bob Trebilcock, Editorial Director
btrebilcock@peerlessmedia.com

As you read through the rest of the issue, I hope you'll find other valuable lessons for supply chain leaders in today's environment. You don't want to miss "Become the supply chain GOAT" to understand what supply chain managers can learn about leadership from Bill Russell, considered the greatest basketball player on the greatest team of all time. And, in light of the recent Colonial Pipeline and JBS cyberattacks, be sure to read "Rethinking cybersecurity: Hidden vulnerabilities in the supply chain."

Lastly, if you haven't done so already, be sure to register for the NextGen Supply Chain Conference at **nextgensupplychainconference.com.** This year's event will be held virtually on November 2–4. 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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BY LARRY LAPIDE

Strategic planning under uncertainty: Long-term muddling-through

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.

In my Insights column, "Decision-making under uncertainty," I discussed planning under uncertainty and risk.* A payoff matrix supports rationale decision-making (DM) for both. It fully delineates the implications of what might happen should each of the possible courses of action be taken when a future outcome occurs.

Once developed, it is used differently for DM under risk vis-a-vis uncertainty. The former assumes one can reasonably estimate the probabilities of random futures occurring (by using historical data). On the other hand, DM under uncertainty recognizes that the chances of futures occurring are realistically inestimable. By and large, the relevant body of knowledge deals with rationale DM under risk.

Scenario planning

In 2004, I managed the launch of MIT's Supply Chain 2020 (SC2020) Project. My last column, "SC2020 Project Update: Uncertainties," provided an update on major uncertainties identified during its second phase.** During the third phase, scenario planning-based approaches were developed by the team for strategically planning for long-term futures that might occur.

This column focuses on the use of scenario planning for doing strategic (i.e., long-term) supply chain planning under uncertainty, as an illustrative example of DM and planning under uncertainty. I believe some of what was developed during the SC2020 Project might also be applied to short-term tactical and operational supply chain planning under uncertainty.

Forecasting into the long-range future (10 years or more) rarely yields meaningful results. Rather than forecasting, it's more useful in strategic planning to identify possible scenarios of futures. For example, three futures are often generated and named:

"optimistic," "most likely" and "pessimistic."

The scenarios incorporate the broad range of major uncertainties devoid of estimates of their probabilities. Even a "most likely" scenario does not presume a probability, just that it is an educated guess. The strategic planning approach developed during the SC2020 Project was based on the scenario planning methodology to help companies align their future supply chains to possible futures, by evaluating a broad variety and wide range of unique winning strategies.

As stated in my prior risk versus uncertainty column, one ascertains the best strategic plan for a company under uncertainty based on its own and its industry's aversion to risk. For example, an optimistic risk-loving one might gamble to try to get the highest payoff possible, while a pessimistic risk-aversion plan might gamble to get the best of the worse payoffs possible.

Another, more practical best strategy might be based on a balance between the optimistic and pessimistic approaches. One of these approaches is termed "minimax regret." This approach attempts to minimize the maximum regret of each alternative strategy, in which regret considers the opportunity cost of not selecting a best decision, if the decision-maker had hypothetically known a future, in advance.

First develop winning strategies

The strategic planning approach espoused by the SC2020 Project involves two major steps. The first step involves assessing how to be successful, while hypothetically conducting business, in each of the future scenarios.

In supply chain strategy planning, this step involves thinking about winning strategies for each future evaluating several important aspects. One starts off with the demand-side by thinking about implications for future products and services. This entails assessing what products will be successful, how to foster innovation and the extent to which intellectual property (IP) can be protected. Also considered is to what extent global (in contrast to regional) brands might be successful, and what types of customized products and services will be needed to be competitive on a regional basis.

From the demand-side strategies, one moves to assessing the implications for supply networks needed to support and enhance the winning products and services. An assessment might evaluate the successful deployment of vertical versus outsourcing strategies, which place greater reliance on suppliers. Coupled with this evaluation is the extent to which international suppliers can be counted on in a future world where global trade might be somewhat constrained.

Next, one thinks about the investments that are needed to develop the capabilities required to achieve success. These include investments in training, technology and infrastructure that will likely differ, depending upon winning products and services, as well as the supply networks. Lastly, this is followed by assessing the implications for enterprise organization and culture.

A scenario planning DM framework

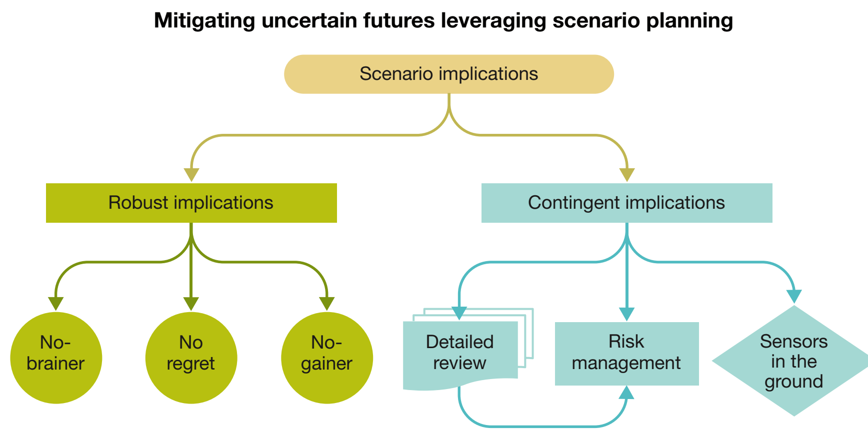
A strategy that achieves success in one future world may not turn out to be successful should another unfold instead. Thus, it is important to understand when successful strategies for one future might turn out to be detrimental or less successful in others. Basically, recognizing that the payoff for each future's winning strategy will likely vary should other futures occur.

Once winning supply chain strategies have been developed for each future, the second step in planning for uncertain futures involves assessing how each winning strategy will fare in the others. Once this is done, the scenario planning DM framework depicted in

Figure 1 is used to classify and then determine which strategies to pursue. As depicted, initial strategies fall into two broad categories.

FIGURE 1

Scenario planning DM framework



Sources: Dr. Mahender Singh, project director, Supply Chain 2020 Project, MIT Center for Transportation & Logistics Lawrence Wilkinson, co-founder and chairman of Heminge & Condell

The first category, "robust implications," includes those strategies for which it is obvious whether to consider executing them. These are termed: "no-brainer," "no regret" and "no-gainer" strategies. No-brainer strategies are those where significant payoffs are gotten under all futures. No regret strategies are those that work well under one or more futures; and are relatively neutral, or minimally detrimental under the others. No-gainer strategies are just not executed because they yield no payoff whatever future happens.

The second category, "contingent implications," includes those strategies for which it is unclear whether to execute them—they are winners in some futures and losers in others. These require more detailed review and analysis. Basically, as the future unfolds, planners need to gather data to more precisely gauge the payoffs, as well as estimate the probabilities and risks of each future. Then risk management techniques take-over when navigating future execution.

As the future evolves, contingent strategies often need to be revised. Sensors in the ground need to be put in place to monitor what is going on in the world, to revise strategies and to re-estimate the chances of each future happening. What is a sensor in the ground? Think about the 2001 event when China joined the World Trade Organization (WTO). It was a prescient indicator of China becoming the economic powerhouse that we see today.

The scenario planning methodology above was piloted by the project team with several companies looking to do strategic supply chain planning. The process is extremely intensive and requires participation from various cross-functional organizations, not just supply chain. It must engage the marketing, sales, operations/manufacturing and finance organizations. It requires extensive meeting time to come up with a winning strategy to initially execute. A project team is then set up to monitor the progress of the initial strategy, assemble data to measure its success and update the strategy over time as a clearer picture of the future unfolds. Over time, the project moves from planning under uncertainty to planning under risk.

Muddling through toward uncertain futures

The British term "muddling-through" espouses the approach that companies will need to take when dealing with planning under uncertainties, in contrast to risks. It is defined as "to manage to do something although you are not organized, and do not know how to do it." Intractable problems can only be solved by muddling-through until sufficient data is gleaned to develop proven, data-based ways to improve the situation. The strategic planning

methodology from the SC2020 Project is essentially a muddling-through approach toward achieving success, while moving toward uncertain futures.

During the pandemic, many public officials muddled-through as they were pressed by the public to make real-time decisions affecting millions of lives worldwide—initially with very little science to go on. They first tackled the virus by identifying several future scenarios regarding the potential numbers of deaths. A worst-case scenario was made public as a call to action, to alert the population how serious and contagious the pandemic was and how many people might die if nothing was done to contain the virus. Other death-related scenarios were also postulated based on how quickly the population could achieve herd immunity—both with and without a vaccine. The virus containment planning and implementation process was indeed under uncertainty, not risk. It is a tragic, yet strong example of muddling-through DM.

The uncertainties included how contagious and severe was the virus, as well as whether people would follow simple rules like wearing masks, washing hands, social distancing and tolerating lockdowns. The decisions were politicized because no one really knew exactly what to do, for lack of data—but many nevertheless had strong opinions. It wasn't until early 2021 that virus containment strategies changed from uncertainty-based to risk-based.

In my Insights column, "Annual e-tailing update: COVID-19 virus shakeup," I discussed the COVID-19 performance of e-tailers.[***] The big winners included Walmart, Amazon, Target and Home Depot because they managed to muddle-through based on their prior experiences in handling disruptions caused by natural disasters, such as extreme weather-related events, earthquakes and wildfires.

Those retailers already had experience making "quick-response" real-time decisions under the uncertainties caused by natural disasters.[****] The traditional brick-and-mortar retailers recognized that they needed to focus on several simple guidelines to thrive under the adverse conditions: stay open as much as possible; take care of your employees and infrastructure; and synchronize your e-commerce business and store operations to provide seamless pickup and delivery services. Amazon was successful because its e-tailing operations can source product from a multitude of sources to be rapidly delivered almost anywhere.

Is this type of planning a job for the sales & operations planning (S&OP) team to take on? I believe it is not. It would take effort from the true goal of S&OP, which is to navigate the enterprise to meet financial performance goals and objectives—such as meeting profit, revenue, asset-utilization and costs targets. The S&OP team does tactical planning under risk. Tactical and operational planning under uncertainty is best left to a special quick response team that is enabled to make high-risk, real-time decisions under the hands-on guidance of an executive management team.

Author's Note: To learn more about how companies handle the uncertainties that emanate from natural disasters, I recommend managers read books by my colleague, Yossi Sheffi of MIT, who has written and spoken extensively on this. His first book on the topic was *The Resilient Enterprise*. Managers will glean guidance from his knowledge that includes how to organize teams (such as business continuity and quick response teams) dedicated to muddling-through disruptions to a company's customer base and supply chain, due to natural disasters. And, how companies have used strategic, tactical, and operations planning under uncertainty for these often-catastrophic events—focusing especially on clawing back lost revenue opportunities as quickly as possible.

****

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— *The* SCMR *Interview:* —

BOBBY BURG, SOUTHERN GLAZER'S WINE & SPIRITS

The supply chain leader for one of the world's largest distributors of wine and spirits discusses how the role of the supply chain manager is evolving, along with the importance of talent and diversity.

BY BOB TREBILCOCK

Bob Trebilcock is the editorial director of Supply Chain Management Review

Some people choose supply chain management as a career. Others fall into it as they're building a career. And then there are those who are born into the industry; essentially, it's in their DNA.

The latter describes Bobby Burg. The senior vice president of operations and chief supply chain officer at Southern Glazer's Wine & Spirits, the country's largest distributor of alcoholic beverages, Burg officially began his career in the industry in 1984, when he joined his family's South Carolina-based wine and spirits distribution business after graduating from the College of Charleston. However, he had worked around the business from the time he was old enough to hold a summer job. Over the next nine years, Burg learned the business from the ground up, driving a truck and working in the warehouse followed by stints in sales, procurement and commercial pricing. Along the way, he earned an Executive MBA from Queens University in Charlotte, N.C.

He joined Southern Glazer's in 1993, when the company acquired his family's business. He has worked in operations ever since, with responsibility for some 6,300 associates. In addition to managing the company's warehousing, distribution and logistics operations, Burg has a broad portfolio that includes planning and procurement, labor relations, environmental, health and safety protocols, security and chairs the crisis management operations for the company. From 2000 to 2006, Burg also served as Southern Glazer's chief information officer.

We spoke in May 2021, as the country was emerging from the pandemic, business was ramping up and shortages were on everyone's mind. A major focus of the conversation was the people side of the supply chain, including the future of supply chain management, talent development and diversity and inclusion at Southern Glazer's (see sidebar).


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Bobby Burg:
senior vice president, operations & chief supply chain officer, 59 years old

1984: B.S. in Business, College of Charleston, S.C.

1991: M.S. in Business, Hugh McColl School of Business, Charlotte, N.C.

1993: Joined Southern Glazer's

2000: SVP and chief information officer

2006–2016: SVP, supply chain strategy

2016: SVP, operations and CSCO

SCMR: *Bobby, if nothing else, the pandemic has put the focus back on the people side of supply chain management. Talk about the importance of people at Southern Glazer's.*

BURG: Our people are the key to our success as an organization. In fact, I would say, without exception, that the reason we were successful during the pandemic is largely due to the type of leaders we have in our safety group and our procurement team, to name two. So, I think it's important to recognize that the people in your charge are the most important asset that you manage. I mean, yes, we have processes to move cases and get orders out the door. That's obviously important. But, at this stage in my career, I think that spending time to get the next generation of leaders ready to take over for me is the real end game. That's the only way we stay ahead of our competitors, including those in other industries.

SCMR: *What do you look for in the managers you hire?*

BURG: I believe supply chain benefits from someone who is a little more aggressive, innovative and forward-thinking in their approach, so the first things I ask when I'm recruiting for a high-level role is: Do they have confidence and passion, and do they believe in themselves? Will they push the envelope and try something that might produce a big win? Incremental improvement is good, but sometimes you have to make a big bet to really move the ball. I tell my team that we can't be afraid to fail. If it doesn't work, you learn from your mistakes and make better decisions in the future.

SCMR: *Do you always look within the industry for talent?*

BURG: I look for the brightest and best player I can get on the team. If a person has never played the sport before—if they've never been in our industry or worked in supply chain—we can teach them the business. I want to find people who are good thinkers, who are analytical and who let data drive their decisions. And I want people who can communicate the things they want to do with a passion and dedication. In a big company like Southern Glazer's, it's easy to keep quiet for fear that someone isn't going to like your idea. But I encourage contrary opinions, shooting holes in ideas to make them even better and bringing in ideas that may sound crazy at first, but may just work. I want to create an environment where people feel comfortable expressing themselves, making a difference and adding value. When I started this group, we didn't put titles on business cards. We're all one team.

SCMR: *How do you integrate people from outside supply chain onto the team?*

BURG: In the last few years, we've made a huge investment to move to a digital platform. Before then, we had a typical high-volume, low-cost, one-size-fits-all approach to order fulfillment. Now, with our platform, we can look at a store, restaurant or bar as if they were an individual consumer. We can offer a lot more customization and a lot more service differentiation. That's a real shift in the way we interact with customers, so we have had to find people who understand the changes going on in the consumer side of the business. It's a different mindset. We've been on that journey for two or three years now.

SCMR: *Is the role of the supply chain manager changing?*

BURG: If we've learned anything in the last year, it's that supply chain is more important than ever. That said, I think the traditional definition of supply chain has matured beyond source, move, pick, pack and ship. And, it has certainly moved past the least-cost model as the number one criterion for supply chain managers. We've learned that people will pay a little more to be guaranteed that they'll get something. Otherwise, there's no value in an Amazon Prime-type subscription.

SCMR: *Is it changing the roles of your people?*
BURG: Yes. In procurement, for instance, we're retraining our people to do analytics and predictive analysis and letting software push out the POs. Our facility managers still have to verify deliveries and cube out the truck to maximize the cost of freight. But the bigger part of the job today is making decisions about fill rates, the timing of deliveries to meet customer service levels and tracking and tracing. We're using technology to be more proactive, less reactive and streamline our operations to reduce the number of moves. That has been difficult for some people, but many have risen to the challenge.

SCMR: *What skills are needed today?*
BURG: We're looking for good analytical skills, good critical thinking capabilities and business resolution process knowledge. If you have those, we can teach you supply chain.

Southern Glazer's Wine & Spirits at a glance

- Operations in 44 states plus the District of Columbia and Canada
- 14.8 million square feet of space across 41 distribution centers
- 2,600 trucks
- Represents more than 1,700 wine, spirits, beer and beverage suppliers, and more than 7,000 brands
- Makes 6.4 million deliveries to more than 250,000 customers annually

SCMR: *How about at the corporate level, where procurement or planning might reside?*
BURG: As a result of the pandemic, planning is experiencing the biggest operational change I've seen in my 40 years in the industry. There was no model for a pandemic because no one was around during the Spanish flu. We have about 70 planners around the country who work with our commercial counterparts in each market. Before COVID, they were very comfortable with their historical numbers. But, as we're planning for 2021, last year's data is meaningless. So, our planners are reinventing the way they work with our commercial partners to do better forecasting. Instead of historical modeling, we're trying to look at more predictive future modeling. To do that, we're going outside the organization to get information. For instance, we're getting information on trends and consumer buying patterns from Nielsen and other agencies. The economy may be opening back up, but we're still affected by what state governments do. Some are opening up sooner than others. Some have more restrictions than others. And, even if restaurants do open back up, we don't know if people will want to go out and pay for a product that they've been consuming at home for the last 12 months. These are the kinds of things we're factoring into our forecasts now.

SCMR: *Have you experienced the worker shortages that other industries are dealing with?*
BURG: When it comes to drivers and capacity, trucking was over-demanded before COVID, and its worse now. The warehouse worker shortage isn't getting any better either. People are not available. Just last night, I wanted to get an Uber food delivery. There was not a restaurant near my home that could deliver, so we went out and picked it up. And then, with all of the big e-commerce companies building out new facilities, lead times to build a new warehouse or do a major project have almost doubled in less than two years.

Bringing in the next generation

SCMR: *Given the competition for people, what should organizations do to attract talent into the field?*
BURG: We have to offer good or better benefits to this generation of worker, whether it be health care or doing things as simple as an appropriate work/life balance, PTO, vacations and those types of things. And, of course, we'll have to continue to match or exceed the compensation of our traditional competitors, but also stay competitive with warehouse and distribution companies like a Sysco, Amazon or any of the big beer distributors.

SCMR: *Recruitment is only the first step?*
BURG: Yes, once you get 'em in, how do you retain them? I believe we have to treat supply chain roles like careers. That includes in our facilities. I also think companies are going

Automation's role

SCMR: Southern Glazer's was an early adopter of high levels of automation. Talk about the role of automation.
BURG: Automation continues to be a priority and we want to continue to evolve the skill sets of our operations to maximize our abilities. It's also critical as we make the shift from a high-volume, low-cost supply chain model to one designed around customizing services for our customers.

SCMR: Can you give an example?
BURG: A year and a half ago, we opened a new facility outside of Houston that is currently a 38% touchless system, meaning once they are received, 38% of the cases aren't touched again until they're shipped out. We were probably 10% to 15% touchless in our best facility before that. We're in the process of opening up a new facility in the Dallas area that will be 51% touchless, and we'd like to get to 70% in the future.

SCMR: Is it a labor play?
BURG: For us, automation is not about labor reduction. Instead, we want to be able to take in all of the growth we're experiencing without needing to add people. And, we want to improve the skills of the people we have so that we can reposition them to work with automation. Hopefully, we can keep them within the family by teaching them new ways to do things.

SCMR: What technologies are making that possible?
BURG: In Katy, Texas we have a robotic depalletizer that automatically puts cases onto a shipping lane and runs about 25% of the case volume. Normally, that would be done by someone manually picking cases from a pallet and putting them on a belt conveyor. In several facilities, we're using a case-handling AS/RS—basically a shuttle system that can handle the weight of liquor cases. The one in Katy has 21 bi-directional robots that can pick cases in the right order sequence for truck loading. We also use it to handle returns: Cases come off the truck and are conveyed right into the system until they're needed for a pick. In major markets, we've used pallet handling AS/RS systems for years to feed our case pick modules. In the fall, we're going to install our first automated palletizing system in Nevada for our beer distribution business. In the future it will have other applications.

to have re-think their work-from-home policies. Working from home for the last 14 months has changed a lot of employees' views of their jobs, especially for jobs that involve a lot of heads down computer work. Companies that offer a more flexible work environment are going to have a leg up, regardless of compensation. Work/life balance, spending more time with your kids—those have come to the forefront with this virus.

Diversity matters

SCMR: *The supply chain is perceived as old, white and male. How is Southern Glazer's addressing diversity and inclusion?*

BURG: Diversity and inclusion is incredibly important. As an aside, two of my three senior vice president reports are women. We've made tremendous inroads in gender diversity in the company. Beyond supply chain, Southern Glazer's has very strong diversity and inclusion programs across the company. We believe we have to represent our customer base in our employee base in a fair and equitable way. We just finished a survey for supply chain and our team believes that we are ahead in terms of diversity in job allocation, job attainment and promotions. I also believe that it's very, very important that every manager not only endorse our diversity and inclusion efforts, but live by them because it makes us a better company. For instance, we've been having "courageous conversations" with our diverse teams across the country around George Floyd. The last piece is that it takes people at my level to continue to teach, mentor, guide and coach those under me. At times, those have been difficult conversations and other times, they've been great conversations.

SCMR: *Is diversity a hiring screen?*

BURG: When we do job postings and recruiting, we are always looking for diverse candidates. On the other hand, we steer away from quotas, and if diverse candidates don't apply for a role, it makes it difficult to hire. That's a challenge for the industry.

Developing talent

SCMR: *How are you developing the next generation of supply chain leaders?*

BURG: Our leadership team has a long list of programs that people can take part in. At the highest level is our Exceptional Leaders Program, which provides very, very

Evolution of the supply chain

SCMR:* *How is your supply chain evolving?

BURG: One of the things we learned over the last year is that we have to take more control over our supply chain. When you off-load processes to third parties based solely on price, you lose control over the speed at which your supply chain can react. So, we have been evaluating our relationships up the supply chain so that we can manage our own destiny, especially in times of crisis. The other big change is that efficiency, or doing everything based on the lowest cost, is no longer our No. 1 criterion. We are redesigning our supply chain around quality, the ability to customize things to our customers' needs and the ability to react and serve our customers in an agile manner. Cost is still in the top three, but it's no longer No. 1.

SCMR:* *Can you think of an example?

BURG: We used to use third party freight forwarders to move product around the globe. They not only aggregated the POs, picked up the loads and put them onto containers, they knew what kind of equipment we needed for a load, whether or not product had to go into air-conditioned trailers, or that a supplier only allowed pickups on Tuesdays and Thursdays. Over time, we became less knowledgeable about our business and more dependent on partners. Now, we want to not only own the commercial relationship, we also want to own the supply relationship and not be so dependent on third parties.

Diversity and inclusion at Southern Glazer's

As noted by Bobby Burg, Southern Glazer's Wine & Spirits is working to incorporate diversity and inclusion in its hiring practices for the supply chain team. It is part of a company-wide effort to develop a workforce that looks like and reflects the company's customer base. "It makes us stronger," Burg says.

Those programs are overseen by Terence Goods, the senior director of diversity and inclusion. Goods says that Southern Glazer's efforts are comprehensive, to include not only gender diversity and people of color, but also the LGBT community, veterans and diversity of thought and experience. More recently, Goods and his team have been leading initiatives to educate the workforce on supporting employees with disabilities.

A recent company-wide effort was a crowd-sourcing initiative that Goods refers to as the "Idea Distillery." All 22,000 of the company's employees were invited to submit ideas on how to better drive diversity and inclusion. Nearly 10,000 employees expressed interest and more than 500 ideas were judged, with 11 winners. First place was an idea to embed diversity-related goals and objectives into executives' annual goals, an idea that is being fleshed out.

One of the more recent initiatives that impacts the supply chain is the "vendor inclusion program," a supplier diversity program led by Southern Glazer's procurement team. Goods says the program will launch in phases, with the first phase focusing on the non-beverage side of the business. "We're beginning with three categories - professional services, marketing and temporary labor," Goods says.

Southern Glazer's has launched a business incubator program on the beverage side of the business, focused on helping women-owned and minority-owned craft wine and spirits companies establish and build their businesses. The program provides education resources to companies just starting out, such as how to create a business plan or what they might need to know about labeling requirements and compliance. "Our end goal is to help them develop a relationship with Southern Glazer's, but it's okay if we can just help them stand up and grow their businesses," Good says. "A few years down the road, they may want to partner with us."

intensive and immersive leadership training to about 25 people a year. That program is sponsored by the CEO and chief commercial officer and is very difficult to get into. But it is broad-based across all functions, including supply chain. Underneath that, there are four or five other leadership programs, and supply chain currently has four people in those. They run from four weeks to 10 weeks. Some are more applicable to managers and directors, and some to vice presidents. We've also participated for years in a program for female leaders at Columbia University.

SCMR: *Is mentoring important?*
BURG: All of my reports have two mentee relationships with people who are two levels to three levels below them. They work with them for a period of 18 months on personal and professional development. In fact, before this interview, my mentee was here for a one-hour discussion. I do think this is one of the things that has been damaged by working from home. While I do agree that a large segment of our workforce can efficiently and productively work from home, you're not going to get noticed, or get collaborative time to grow into a good manager, on a Zoom call. I'm very passionate about having individuals at the manager level and above in the workplace.

SCMR: *Is it hard to get noticed in a company as large and distributed as Southern Glazer's?*
BURG: It can be hard to find advocates that can help advance your career in a company with 22,000 employees. I try to take a personal interest in those people in supply chain who want to succeed, and I think my management team does the same. We talk about the people who are showing passion, desire and ambition and try to make sure that someone is watching their progress. That's important for retention. One of the things I tell my team all of the time is that if someone leaves us for a reason other than money, that's on us. We should have identified that person and challenged them so they didn't get bored and move laterally for another job.

The importance of analytics

SCMR:* *Are you investing in analytics?
BURG: Analytics has become so much more important when it comes to forecast modeling and predictive analysis. We really ratcheted up the analytical skills of our team so that we can take information we're getting from organizations like Nielsen and from our retail customers in the takeaway space—the retail stores—and the on-premise space—the bars, restaurants and institutions—and then integrate that into our historical data to create a much more predictive model of what's going to be needed in the future.

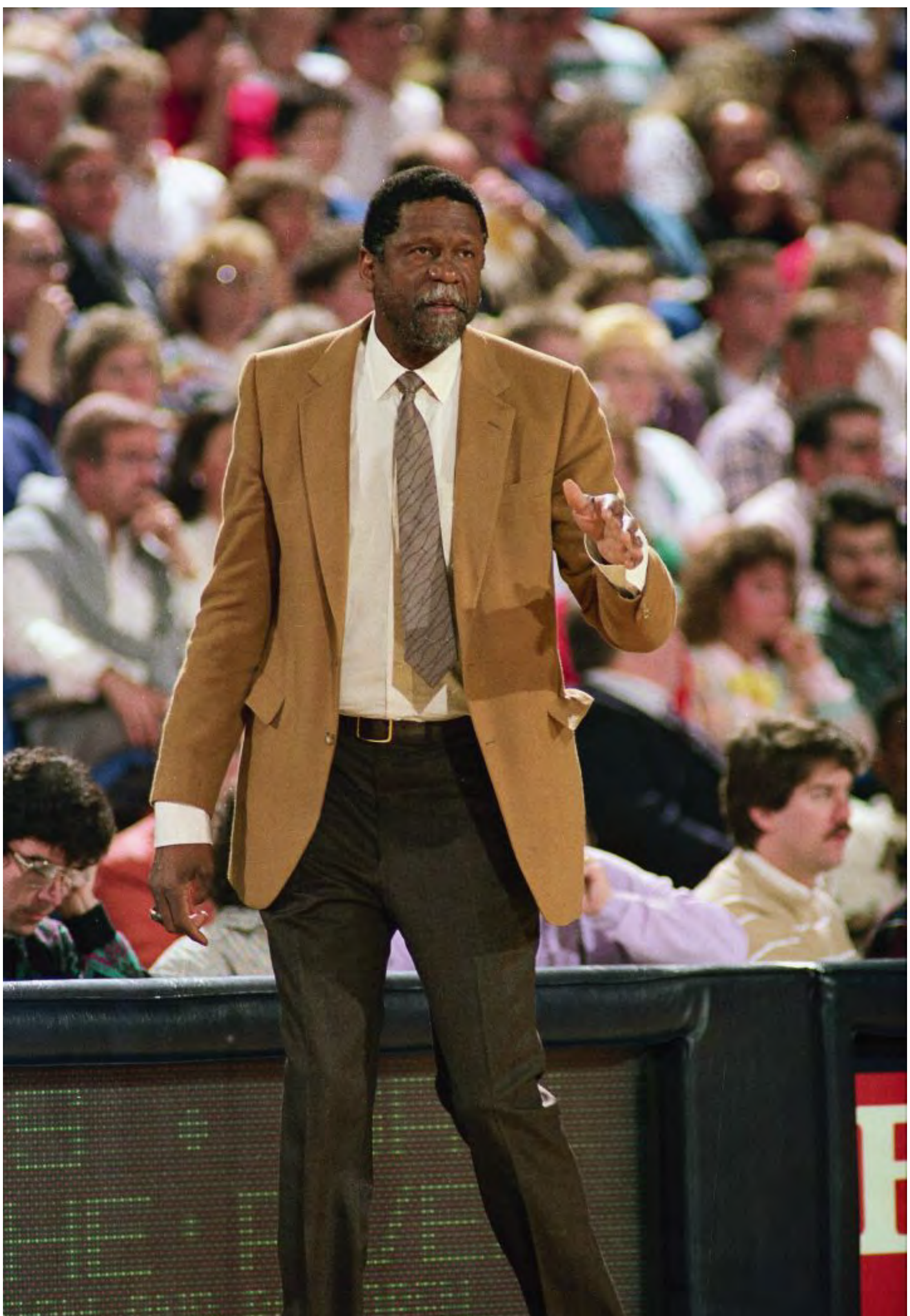
SCMR:* *What's driving that?
BURG: Right now, it's supply shortages. Lead times have doubled and there's less container space available, so we're forced to forecast out six months instead of two months to three months. What's more, there is no model for how to come out of the kind of shutdown we experienced, but our supplier base is relying on us for data and analytics to help them get the right mix in their finished goods stock. Had we not invested in an analytics team before COVID, we would not have fared as well as we did through this.

SCMR: *Any final thoughts?*
BURG: Yes. One of the things I think is lost in the way people are trained today is the value of being well-rounded. I was the CIO here for six years, and yet I had no classical training to be a technology leader. Traditional supply chain leaders aren't in charge of labor relations or environmental, health and safety protocols. I tell my people all of the time that if there's an opening in another department—say, they can work in promotions for a couple of years or manage a DC—let's make that happen. You can't get that kind of cross-functional experience working in a corporate office. At the end of the day, you can bring those new skills sets back to the supply chain and be a better manager.

BECOME THE SUPPLY CHAIN GOAT

Bill Russell's winning formula for building one of the greatest teams of all time was team ego.

BY STANLEY E. FAWCETT, A. MICHAEL KNEMEYER, AMYDEE M. FAWCETT AND SEBASTIAN BROCKHAUS



GOAT! It's a little word, but it drives passionate debate in the sports world. Ardent fans argue vehemently over who is their sport's GOAT—Greatest of All Time. They rely on statistics, point to lifetime achievements and call out head-to-head match ups. Still, the question almost always goes unanswered. How do you compare the greats of any sport across eras—especially as technology, training and everything else (including the rules of the game) continue to change? You can't expect any athlete to play, and win, "against ghosts, past, present or future."

Now, with that disclaimer front and center, we'll make the case for two GOATs. Let's start the debate by asking: "Who was the most outstanding player on the best team in professional sports history?" If you are a sports fanatic, you may be disappointed the question is so easy. If you are not an avid sports fan, you may have guessed the right team even if you struggled to identify the player's name. We've given you a moment to think and here's the answer: Bill Russell is the player, and his team is the Boston Celtics of the 1960s.

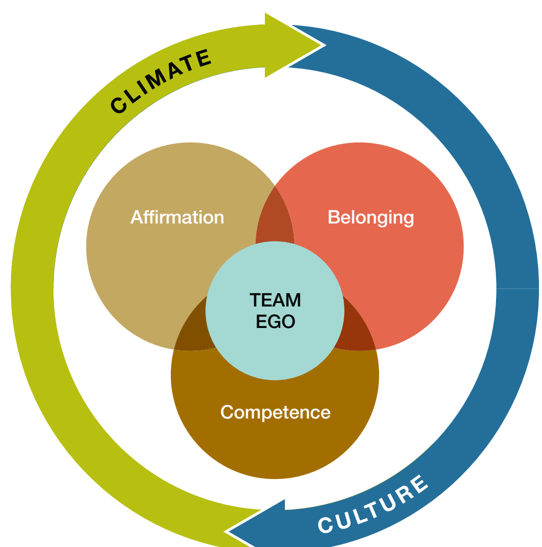
Russell led the Celtics to 11 National Basketball Association championships in 13 seasons, including nine of 10 championships in the 1960s. Now consider this: The last two championships came in 1968 and 1969 when Russell didn't just play as a Celtic but also coached the Celtics—the first black head coach in any U.S. professional sports league. This unprecedented, and never repeated, run of success led Sports Illustrated to name Bill Russell as the "greatest team player on the greatest team ever."

Perhaps you're thinking: "That's remarkable, but why should I care? I'm a supply chain leader, not a sports analyst." Here's the answer. Your job really isn't so different from Bill Russell's. You both get paid to win, not just to play, in your respective arenas. Winning in today's global marketplace, as in the NBA, is all about the team. Neither you nor Russell could win on your own. Like you, Russell played with great talent. Yet, the 1960s Celtics did something most sports teams—and supply chains—fail to do. They won because they learned to "surrender the me for the we." Russell's Celtics cultivated "team ego"—an ability you need to master.

Why don't most teams—including supply chains—build team ego? The answer is simple: The way they manage their all-time greatest asset—their people—keeps everyone focused on the "me" instead of the "we." The result: The collaborative and creative capacity needed to become consistent champions is stifled. To help you unleash the collaborative and creative power of your people, let's introduce the ABCs of team ego (see Figure 1). But first let's take a quick look at how the Celtics became the winningest team in professional sports.

FIGURE 1

The ABCs of team ego



Source: Authors

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Team composition: The Auerbach Way

A charter member of the NBA, which was formed in 1946, the Boston Celtics' storied history began in a less than stellar way. In its first four seasons, the Celtics piled up losses—and fired two head coaches along the way. In 1950, the Celtics offered Red Auerbach $10,000 to change the team's trajectory. Auerbach brought vision, tenacity and a winning record to the Celtics.

Auerbach was obsessed with winning. More saliently, he was savvy enough to sense that the best teams—not the best players—win championships. He evaluated talent through this team-first lens. If a player fit his team-centric vision—right skills, right attitude—Auerbach would take risks like drafting Chuck Cooper in 1950, the first African American to play in the NBA. He also acquired the rights to sharp-shooting guard Bill Sharman—a player experts assumed would choose baseball over basketball. Sharman was the perfect complement to star point guard Bob Cousy. During the next five years, Auerbach added quality players like enforcer Jim Loscutoof and sixth man Frank Ramsey.

By 1956, the Celtics were an offensive juggernaut, but a perennial playoff bridesmaid. They lacked the rebounding and defense to win it all. Too successful to pick early in the draft, Auerbach traded two popular players—Ed Macauley and Cliff Hagan—to St. Louis for the second pick in the draft: William Felton Russell. Russell's rookie season brought Boston the first of its 17 NBA titles.

Team chemistry: The Russell Way

Russell fit Auerbach's mold perfectly—a team player obsessed with winning. Russell became the glue that held the Celtics together through more than a decade of drafts, trades and retirements, including Auerbach's own. Russell described his team-oriented psyche, saying: "What I enjoy most about sports is the internal team dynamics. How do teamwork and preparation influence the outcome? How close can great teams get to reaching team ego and ignoring individual achievement?" Russell's Celtics had talent, but they won because they cultivated team ego.

Russell played a paradoxical role. He brought an intensity and a comfort level to the Celtics that made it easy for team ego to emerge. Contributing to wins, not pursuing personal achievement, was the goal. Each player knew his role and took responsibility for performing it. Russell set the example. His intimidating interior presence and shot blocking freed his teammates to relentlessly defend the perimeter. His rebounding triggered the famed Celtic fast break, which Cousy ran to perfection. Together, they won more than any team in history.

Russell's winning ways changed the game. Blocked shots and fast-break points became statistics worth tracking. More fundamentally, in a game dominated by offense and individual exploits, the Celtics dominated with team defense and balanced scoring. In the 1962-63 season, for instance, Russell averaged a career-high 18.9 points per game. Not a single Celtic finished in the Top 10 in scoring. Wilt Chamberlain, the scoring champ, averaged an eye-popping 50.4 points per game. Yet, NBA players voted Russell his third MVP award. Teammate Don Nelson explained: "There are two types of superstars. One makes himself look good at the expense of the other guys on the floor. But there's another type who makes the players around him look better than they are, and that's the type Russell was."

What are your takeaways? Certainly, you didn't miss the value of Auerbach and Russell both being team-first leaders. Beyond shared values and shared leadership, consider adding the following two rules to your to-do list.

1. The Auerbach rule. Evaluate talent through a team-first lens. Fit matters: Every player must bring complementary capabilities to the team (right skills). Every player must be willing to contribute to team ego (right attitude).

2. The Russell rule. Cultivate a climate that makes it easy for team ego to emerge.

Wins will follow

Now, a warning: As you pursue your quest to win, keep these two rules in proper sequence—and balance. That is, right composition, then right chemistry. The wrong players guarantee you will never achieve team ego. But even the right cast of characters might not either. The truth is that most teams never figure out team ego. Chemistry is harder than composition. The ABCs—affirmation, belonging and competence—can help you, the supply chain leader, cultivate a culture that makes it safe to surrender the "me" for the "we." But, the ABCs don't just happen. You must invest in them daily, and over time, to cultivate team ego.

Why you should care about the ABCs

Did you know that Bill Russell's journey to GOAT almost didn't happen? At 6'10" Russell looked like the prototypical ballplayer, but he grew very late. In high school, he wasn't very good. Frank Robinson, baseball great and teammate at McClymonds High, described Russell's game: "He couldn't even put the ball in the basket when he dunked." Lacking fundamentals, nobody thought Russell had the game to play collegiately. He planned to work in the shipyards like his father to save money for college.

Then Hal DeJulio, a former player and occasional scout for the University of San Francisco, came to an Oakland High-McClymonds game. There to help the Oakland coach, DeJulio noticed Russell, who played a rare standout game. The next week, DeJulio offered Russell a scholarship to USF—before talking to Phil Woolpert, USF's head coach. With Russell anchoring the defense, USF won back-to-back NCAA championships. Russell added Olympic gold in 1956. The greatest winner in professional sports history almost never made it to the hardwood.

Now, we promised to make the case for two GOATs. One down, one to go. We've hinted at the second GOAT—your people as your company's all-time greatest asset. Few managers argue against this claim, but few invest as if they really believe it. Dilbert creator Scott Adams is hugely popular because he mocks the way companies treat their people. Number one on his list of "great management lies" is this classic: "Employees are our most valuable asset."

Guru Peter Senge explains: "We know how to engage in technology and machinery, but we're at a loss when it comes to investing in people." This is where the GOAT debate really begins. What is your source of competitive advantage? Technology gets the oohs and aahhs—and the money. Scott Adams taunts that employees are valued "somewhere toward the lower end of the office supply hierarchy." Too often, it seems he's right. Like teenage William Felton Russell, employees are the underdeveloped, overlooked source of winning advantage.

Now, consider tomorrow's competitive world. Rivals will be fierce, disruption rampant. Technology cycles will be compressed—and everyone is already eying AI and robotics as the answer. But as everyone buys technology, how will you come up with a hard-to-copy edge?

Team ego may be your best investment. People, your people—and your supply chain's people—are the only source of the collaboration and creativity, the insight and ingenuity you need to outthink rivals and win in the marketplace. Your people might even help you employ technology in game-changing ways. Can you afford to overlook their potential, relegating them to the end of the resource bench? The good news: Russell and his Celtics exemplify how you can cultivate the ABCs to encourage team ego to emerge. Let's do some scouting.

Affirmation is the art of encouragement

In basketball, as in supply chain management, encouragement isn't just patting someone on the back, telling them they are doing a great job. Encouragement is giving confidence of success. It's not real if it doesn't invite action such as practice and improvement. You teach always, praise often and correct when necessary.

Bill Russell learned the power of encouragement from his dad Charlie, who attended every one of Russell's high school JV and varsity games, even when Russell wasn't good enough to get in the game. What motivated Charlie to come to every game? After all, he didn't even tell his son he was there. He purposely sat where Russell would never see him. Charlie wanted to be aware of what his son was doing and going through. What does this mean for you? You need to know what is going on with every member of your team. If you don't, you won't teach, praise and correct meaningfully—or in the right balance. You'll be as ineffective as Dilbert's pointy-haired boss—blah, blah, blah.

Russell also learned from Auerbach, who was a masterful motivator in part because he used this know-your-player approach for affirmation. Here's how Russell described Auerbach:

"Red's genius as a coach was mostly in his skills as a motivator. He was a master psychologist who knew that there are as many different ways to psyche people as there are personalities. He knew he had to yell at Heinsohn shrewdly and personally, whereas he bullied Satch and Nelson… with KC Jones, you had to be honest and leave him alone; he'd do the rest. I watched Red spend time with the Celtics who played the least…he always talked to them enough to remind them how important substitutes are to a team. He tended to be more supportive of them than of his regulars."

Russell added this technique to his game plan—on the court and as a coach. Consider his definition of a perfect game, something he constantly sought to play:

"First, of course, we had to win. I had to get at least 25 rebounds, eight assists and eight blocks. I had to make 60% of my shots, and I had to run all my plays perfectly, setting picks and filling the lanes. Also, I had to say all the right things to my teammates—and to my opponents."

Here's the point: Russell connected his words—teaching, praising and correcting—to his teammates' performance and to the team's success. Affirmation gets everyone into the game and encourages them to bring their best game.

The bottom line: What we say elevates or deflates. Every interaction we have with our team members either invites them into the game or takes them out of it. How effectively are you affirming your team members? To find out, try this little exercise.

- **Step 1:** Conduct a brainstorming session. Identify everything you do that makes your people feel undervalued—i.e., unappreciated or incompetent. Write each item down.
- **Step 2:** Repeat the exercise, but this time identify everything you do that makes your people feel highly valued—i.e., appreciated or competent. Write each item down.
- **Step 3:** Do this exercise with every manager in your organization, preferably as a group.

Now, step back and be an objective observer. How would this exercise play out in your organization? What would you see? Here's a likely scenario. Managers are hesitant as they build out their "unappreciated" list. Nobody wants to admit they do many things that take the air out of their team. Once someone injects a little candor, others begin to identify their own deflating behaviors. They fill the whiteboard—top to bottom (see Figure 2). By contrast, as managers build their "appreciated" list, they tend to get a quick start. The goal: redemption. But they quickly run out of specifics. White space remains. If you're keeping score, you need a ratio of five to one appreciations to critiques to build an affirming culture.

So far, we have talked about how to cultivate a positive, proactive work culture—your to-do list. Let's take a moment to identify two things you should stop doing. Stop being a distracted listener and stop micro-managing. Here's how Russell identifies distracted listeners, that is people who hear, but aren't truly listening.

1. Do you find yourself trying to come up with a "better" story than the one the speaker is telling?

2. Are you nodding yes when you are not really listening just to keep the conversation moving?

3. Do you find that you forget what has been said immediately following the conversation?

4. Are you asking trivial questions to seem as if you are listening?

5. Are you always interrupting because you feel you have a "more important" thing to say?

Did you keep score? Do you practice any of these bad habits that communicate: "I don't value you—or your ideas"? To earn trust, you must be present.

You must also give trust. Russell says it this way, "You have to trust them to operate on their own (that's why you hired them in the first place)." When you call every play from the sidelines, you take your team's ability to create away—and you communicate that you don't really value them. Your stop-doing list may be short, but it is critical. If you don't listen or when you micro-manage you put yourself in the game and your team on the bench. Not even Bill Russell could win that way.

O.C. Tanner models affirmation—after all, it's their business. The company designs and manages corporate recognition programs. O.C. Tanner's sales pitch is simple: "Celebrating great work inspires people to invent, to create, to discover. … The most influential way to appreciate people is to provide a fertile environment where they can grow." O.C. Tanner conducts research on what makes a great place to work and how these behaviors enhance performance. Expertise in hand, backed up by years of experience, O.C. Tanner works with companies to create an affirming workplace.

Like Bill Russell, senior leaders at O.C. Tanner walk the talk. They don't just say the right things, they listen intently.

1. Peer-to-peer recognition. O. C. Tanner has created a system that makes it easy for employees to give each other "kudos" to express appreciation or recognize great work. Peer-to-peer recognition strengthens connections, enhancing psychological safety—and the odds employees will take risks, share their best ideas and enjoy a positive employee experience.

2. Pet projects. The supply chain group invites, you might say expects, each team member to contribute to strategy

FIGURE 2

The affirmation scoreboard

What do you do to make your team members feel...

INCOMPETENT AND UNDERAPPRECIATED

THINGS WE SAY
- Didn't you read your email?
- What were you thinking?
- If I had wanted…I'd have asked?
- I make the decisions around here.
- Why didn't you…?
- I really don't have time for that.
- Don't you ever listen?
- Are you ever going to get around to…?

THINGS WE DO
- Take credit for other people's ideas/work.
- Promote the "fake" open door policy.
- Promote the "phony" suggestion program.
- Run meetings that waste people's time.
- Assign busy work.
- Reward game playing and politics.
- Offer insincere praise.
- Play favorites.
- Always correct–even when it doesn't matter.

THINGS WE DON'T DO
- Not being present.
- Not really listening.
- Not following though on promises.
- Learn about each person individually.
- Offer meaningful and appropriate praise.

COMPETENT AND APPRECIATED

THINGS WE SAY
- Thank you. I appreciate you.
- What are your thoughts on this issue?
- Help me understand your perspective.
- How can I help…?
- What am I doing that makes your job harder?

THINGS WE DO
- Always give appropriate credit for ideas/work.
- Recognize each individual's skills and strengths.
- Offer authentic praise, even for the little things.
- Write personal notes to acknowledge my team.
- Trust my team to innovate and improvise.
- Mentor team members one on one.
- Learn from each person–and acknowledge this.

THINGS WE DON'T DO
- Belittle my team members in public.
- Use metrics to create harmful competition.

Source: Authors

development. Every six months, employees pick pet projects, form teams, and equipped with Lean six sigma skills, they work the problem—or opportunity. They then return and report, sharing their results with top management—and with one another.

By living what it teaches, O.C. Tanner has repeatedly been named one of *Fortune* magazine's "100 Best Companies to Work For."

Belonging is the science of safety

What is belonging? Employees talk about belonging as if work is a second home. Colleagues become a second family. They feel emotionally safe. This sense of security is now called psychological safety. The science is clear: Psychological safety gives employees permission to share ideas and take risks—to be themselves—without fear of being criticized by peers and organizational leaders.

Intuitively, Bill Russell sensed the need to cultivate psychological safety 30 years before academics began using the term. An NBA season is quite disruptive, filled with travel, crazy schedules and strange hotels and food. Russell wanted to create a sense of home and stability for his teammates. He threw Christmas parties for them and their families. In 1962 he even took shocked rookie John Havlicek around town to get a good price on a stereo. Now, let this thought sink in. How many two-time NBA MVPs take the new guy under their wing, almost like a big brother, to go shopping for a stereo? Russell explains: "All of us were strangers in a place far from home. But we made it into a unique situation. Cousy started it. He was absolutely sincere about being a good teammate." Belonging helped Russell and his teammates build a strong sense of team identity—the Celtic Way.

Here's the point: People want to belong to something special, to be a part of something bigger, cooler than themselves. Winning, and winning a lot, made being a member of the Celtics truly unique—a once-in-a-lifetime opportunity. That's one reason why players seldom left the Celtics. To belong, they were willing to pay a price. That price shows up in two ways.

1. Personal sacrifice. The Celtics made the fast break a weapon. Russell's willingness to sacrifice made it work. Russell's 20-plus rebounds per game triggered the break. Yet, Russell knew that Cousy wasn't going to pass him the ball when he filled the lane, at least not if Heinsohn was on the other side. Heinsohn got the pass—and the basket—every time. Russell's response: "He simply had so much confidence in Heinie. So, I had to discipline myself to run that break all-out, even if I knew I wasn't going to get the ball."

2. Personal accountability. Belonging isn't saying: "We're all going to be nice to each other." It's about each person accepting a simple fact: "If I want to belong, I can't, I won't, let my team down." Belonging means living up to the standard set by peers; performing at the same high level everyone else does. Russell explained the mindset, noting that each teammate, "seemed to understand perfectly that everyone had to play his part for us to win."

Russell approached the game with what he calls "outside-in thinking." He was inclusive—he wanted teammates to belong, and to succeed—until they showed they weren't willing to pay the Celtic price and contribute to team ego. Sam Jones, the Celtics' go-to scorer, made this point clear, saying he couldn't recall a single instance when Russell "jumped on anyone's butt. … Anybody who didn't fit in, he'd just dismiss him."

Russell set the example. He paid the price. If you weren't willing to pay the same price, you didn't belong.

Southwest Airlines, led by another iconic winner, Herb Kelleher, proves the staying power of belonging. Kelleher founded Southwest in 1967 as a scrappy, low-cost, no-frills airline. Over the years, Southwest has done almost everything to keep costs down, except scrimp on culture. Following are two examples.

- To reduce maintenance and training costs, Southwest only flies one plane—Boeing's 737.
- To keep planes in the air and costs per seat mile down, Southwest turns its aircraft in 15 minutes—one third the industry average.

The result: Southwest is incredibly productive—and profitable. Southwest scored profits 47 consecutive years, an unprecedented and likely never-to-be-repeated run of success.

How does Southwest do it? Before answering, let's remind you that Southwest doesn't own any proprietary technologies or business process secrets. Culture is Southwest's secret. Back in 1967, Kelleher made this connection—happy *employees* deliver delighted customers. So, he invested in belonging. Kelleher focused first on getting the right people on board. One classic story goes like this. A hiring VP approached Kelleher, concerned that she had interviewed 34 people for ramp agent and had yet to make a hire. Kelleher's response: "If you have to interview 134 people to get the right attitude on the ramp in Amarillo, Texas, do it." Southwest hires for a "warrior spirit, servant's heart and fun-LUVing attitude."

Once on board, employees are given autonomy, the leeway to express themselves and try new things. As this classic story illustrates, they enjoy psychological safety. Years ago, on a Dallas to San Diego flight, Karen Wood, the flight attendant, made this pre-flight announcement:

"If you haven't been in an automobile since 1965, the proper way to fasten your seat belt is to slide the flat end into the buckle. To unfasten, lift up on the buckle and it will release. And as the song goes, there might be 50 ways to leave your lover, but there are only six ways to leave this aircraft: two forward exit doors, two over-wing removable window exits, and two aft exit doors. The location of each exit is clearly marked with signs overhead, as well as red and white disco lights along the floor of the aisle. Made 'ya look!"

Passengers didn't just pay attention, they applauded when Karen finished. Individuality, humor and doing whatever's necessary to serve the customer became the Southwest way.

Like Russell, Kelleher modelled the desired behavior, stepping in to handle bags, dressing as Elvis Presley and arm-wrestling a rival CEO for rights to the slogan: "Just plane smart." Not surprisingly, employees LUV belonging to the Southwest family, and according to an Indeed.com survey they feel they do—at a rate 2.5X higher than key rivals. Southwest changed its logo to a heart because "without a heart, it's just a machine."

Figure 3 is a checklist to help you see how well your company stacks up against what employees say create belonging.

Competence keeps the final score

With your people in the game, bringing passion, collaboration and creativity to work every day, how do you help them go to the next level? Elevating competence—i.e., helping teammates step up to their best game—is how you make winning a habit. Let's check in and check out Bill Russell's three go-to moves to make his teammates play better.

1. Recognize and value individual skills. Russell made it a habit to scout his own teammates. He said: "I needed to know who the different players were, what their tendencies were, their habits, their preferences. I had to learn about their thinking, their temperaments. For me to play my best game, I had to discover theirs." Russell's goal: Play to his teammates strengths and cover their weaknesses.

Are you playing to your team's strengths?

2. Invest in team members' success. Consider this story. "One night, while I was leading a break on the floor, I noticed Bob Cousy over my shoulder, running behind me. I told myself something was wrong. … Bob Cousy, to this day, is the best I've ever seen in the NBA at running a fast break. What I was inadvertently doing was taking him out of his game, out of what he did best. What I did after that was to give Cousy the ball as soon as I got it and then fill the lane so he could go to work. That way I was helping him to play his game, which was exactly what our team needed." Of note, neither Cousy nor Auerbach ever called Russell out. He simply decided to invest in Cousy's success.

What are you doing to invest in your team members' success?

3. Model the behavior. Preparation precedes power—a reality Russell understood perfectly. In high school, he started studying other player's moves, what made them effective. He would imagine himself guarding them, thinking through every move and countermove. He even practiced in front of a mirror at night. Russell's enthusiasm for preparation was contagious. Satch Sanders said: "We rose higher because of him."

Are you modeling the behaviors you expect to see from your team?"

FIGURE 3

Employee statements on belonging

Treat each person as an individual.
Celebrate the accomplishments of the team–and team members.
People stick around because they feel like the belong to something special.
Everyone is empowered to make a meaningful contribution.
Hire from within: Allow employees to advance in the organization.
Meetings are more like town hall discussions.
Care for the whole person–e.g., a gym and health services.
Company has an authentic interest in team members beyond work.
Company works consistently to build a sense of community.
Team members are given space to try new things and learn from failure.
Benefits and salaries show the company cares about employees.

Source: Authors

One more thought: How would you measure your success as a leader? Here is Russell's standard: "I always thought that the most important measure of how good a game I'd played was how much better I'd made my teammates play." In today's socially conscious world, this standard will be one of the most valued and satisfying measures of your success.

Wegmans, the family-owned, underdog grocer from Rochester, NY, employs the ABCs to fend off fierce rivals Aldi, Amazon and Walmart to maintain its winning, and growing, ways. Let's review Wegmans game plan.

- **Affirmation.** Wegmans philosophy is: "Employees first, customers second." Nicole Wegman, senior vice president, claims: "We have these incredible people in our company… and 46,000 heads are better than one." Wegmans invests as if they really believe it.

- **Belonging.** Wegmans revels in not just being family-owned but also in creating a family-like feeling. Employees enjoy autonomy and psychological safety, providing honest feedback through Wegmans' Open Door Days, Huddles and two-way Q&A with the SVP of store operations. The result: Employee turnover is one-third that of rivals.
- **Competence.** CEO Colleen Wegman says: "Learning and growing means that you're given the opportunity to improve every day. No matter what part of the company you work in, it is important to us that everyone is engaged in our business, supports what we do, and continues to learn and grow." Every year Wegmans invests more than $50 million in learning, grants scholarships to 5,000 employees and offers management trainee, leadership development and mentor programs. One sign that competence is elevating: Most store managers joined the Wegmans team as high school or college students.

Cultivating team ego has helped Wegmans stay on *Fortune*'s "100 Best Companies to Work For" since 1998, claiming the No. 4 slot in 2021.

Like the Celtics, the ABCs work best when they work together. Try out the diagnostic in Figure 4 to evaluate whether you are cultivating a "me" ego or a "we" ego.

FIGURE 4

Are you building a "me" or a "we" ego?

How would our employees describe their working environment?
Put a checkmark in the appropriate column. Calculate your score (0-12)

PREDICTORS OF "ME" GO	Score 0	Score 1	PREDICTORS OF "WE" GO (TEAM EGO)
Affirmation			
• Mangers don't listen			• Mangers care about my opinion
• Must deal with frequent criticism			• Receive frequent positive reinforcement
• Individual contributions expected			• Individual contributions celebrated
• Compensation among industry's worst			• Compensation shows I'm valued
Belonging			
• Little control over tasks and job			• Possess autonomy
• Rigid and demanding workplace			• Flexible and accommodating workplace
• Feel like just another number			• Viewed as a valued member of the team
• Must be careful about what I say and do			• Can be myself without worrying
Competence			
• Dead-end job			• Opportunities to continually learn
• Training focused only on current job			• Training opens future opportunities
• All training is focused on work			• Training enhances personal well-being
• Seen only as employees			• Use skills to make positive social impact
TOTAL SCORE			

What does your score mean?

Scores of an **8 or under** indicate a need to **re-evaluate cultural orientation**
Scores **over 10** indicate a culture that promotes **creativity and collaboration**

Steps to team ego overhaul

If action is needed, try the following exercises

Break your team into groups of 3 to 6 people. Have each member read this article.
Have each group member brainstorm 5 to 10 ideas to cultivate a Team Ego.
Bring the group back together to discuss the individually generated ideas.
As a group, select the 3 to 5 ideas that can be most impactfully implemented.
Make these best practice ideas the target for pet projects.
Establish priorities for the remaining ideas.
Bring groups together to share both sets of ideas. Refine/establish priorities.
Allocate resources.
Document implementation and results.

Who do you take?

Let's ask a final question: "Russell, Wilt, Jordan, LeBron—if you have to pick, who do you take?" Here's Russell's response: "You pick Bill Russell—for a reason—the way I play, my team wins." That's your goal too—to help your company win.

And to win, your company needs to out innovate and out execute rivals. The ABCs remove the barriers that keep your people from bringing their best ideas and best energy to the game. They don't just get everyone into the game, they pump your people up so that they can do what they do best to give your team an edge.

Havlicek paid Russell the ultimate compliment, saying: "He made other people around him better. More than anyone else. Ever." The ABCs can help you pursue this legacy.

It's time to adopt a customer-centric attitude

Over the last year, customers have been forgiving when it comes to delays and missed expectations, but that goodwill won't last forever. The best supply chains must put their customers at the center of their operations.

BY YEMISI BOLUMOLE, SCOTT J. GRAWE,
JOHN CALTAGIRONE AND PATRICIA J. DAUGHERTY

Buyers' expectations regarding logistics customer service have consistently increased over the years. Demands for better, faster service have become the norm, not the exception. Almost all customers seem to expect fast service along with flexible delivery options that are customized or tailored to their individual needs. In a previous article*, we termed this the "age of customer impatience."

Of course, the escalated expectations have, in large part, been driven by the shift from the dominance of traditional retailing to a substantial emphasis on e-commerce and omni-channel retailing. Many consumers expect to be able to choose from a range of shopping options such as ordering from their mobile devices or computers, shopping in stores, shopping online and picking up in store. Logistics plays a key role in making all of this happen seamlessly.

Fast forward to 2020-21. As COVID-19 rewrote the rules of retail, it's not an overstatement to say that even more extreme demands have been placed on supply chains during the global pandemic. The pandemic accelerated the shift to online shopping at the same time as social distancing rules and infection outbreaks in facilities limited the number of employees in stores and distribution centers. Staying connected in the contactless economy became critical, and supply chain professionals responded and adapted to new demands. For the most part, this response has been better than one would have expected.

Most important of all, customers became more aware of the intricacies of supply chain management challenges as they dealt with out-of-stocks, delivery lead times that often far exceeded two-days and difficult returns, all while coping with rising service costs. The upside is that most became less impatient and more forgiving. Of course, with the brick-and-mortar economy shut down for all but essential services, they didn't have much choice.

This made us wonder if customers' apparent attitude adjustment represents a permanent change, or, if, in reality it will be temporary? Have customers merely adopted a temporary workaround to their service expectations, or are we witnessing a slow but steady shift away from the age of customer impatience? Will customer behavior in a post-COVID world retain some of the "patient"

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habits learned during the pandemic, or will customers simply revert to a "what have you done for me lately" mindset? Cue the age of customer impatience.

To explore this issue, we went to the experts: People who deal with customer-related issues on a daily basis. This group of professionals provided their perspectives on how companies coped with customer service pressures during the past year and how they anticipate this will affect future business operations. The individuals work in a wide range of areas including retailing, distribution, manufacturing, transportation and consulting. The following narrative provides an overview of key issues.

More than ever, businesses must adopt a customer-centric attitude

Many of the people we talked to said that for now, most customers are understanding. For example, they will accept extended lead times as long as those lead times are predictable. As one respondent stated, "Many customers are happy just to be receiving product in this (current) environment. So, adding predictability to the mix is delighting customers at least for now."

How long will this goodwill last? Perhaps not for long: Another respondent predicted that "the pandemic excuse is going away. Customers are no longer tolerating three days to five days and longer "estimated" delivery windows. They want what they want with a guaranteed delivery in two days or less—consistent with the Prime promise."

While some respondents acknowledged that "customers are looking forward to getting back to the way that things were before COVID," others suggested that "what customers expect hasn't necessarily changed a whole lot. They expect timely (service). In today's environment, they understand the opportunities out there to have systems and technology to track shipments and, therefore, why couldn't they get the information sooner?" Another added: "In the B2B environment, it is hard for our customers to justify poor service when the impact to their organization can cause machines to be down and product not to ship. COVID may have given us some leeway for a period of time, but for the most part that has passed."

Not surprisingly, there remains an emphasis on the need for maintaining strong customer relationships—especially now. Relationship building should include operating in a trustworthy and empathetic way, being able to anticipate customer needs and generally being customer obsessed. As one respondent noted: "All managers in the supply chain have to be aware of the trend for consumers to expect product/service delivery on demand. With folks in their homes all day every day, they are begging for—and now expecting—delivery on demand with all of their purchases. That mentality will seep into other parts of their customer service expectation psyche."

In keeping with the relationship trend, one issue emphasized by a number of the interview respondents was the need to make business operations more personalized than ever. "Customers want to feel like the product or service has been vetted and tailored with just them in mind," said one respondent. Added another: "Every aspect of customer service must be personalized to the consumer's behaviors, wants, biometrics and expectations." This is possible—not easy, but possible.

Without a doubt, these changes have been coming to supply chains for years, but in 2020, keeping an eye on what delights each customer was more important than ever. Retailers need to personalize services based on customers' actual needs and behaviors. Unfortunately, while many companies have been doing this for decades, one of our respondents noted: "It is not as common as it can be—or as it should be." Some companies, for instance, try "lazy ways" to personalize their messaging, such as using form fillers. Not enough companies "do adequate research or listen enough to truly personalize the customer service experience," a respondent said.

Another illustration of the changing business environment came from a company with a changing perspective on what makes a "strategic vs. non-strategic customer." Segmented customer service has long been the norm, with the most important customers typically demanding and receiving better service. However, these norms are being redefined as companies are finding that even "non-strategic" customers are expecting more. As one manager noted: "We recently took on new business with a non-strategic customer and the agreement was that we would monitor for the potential of late pick-ups. While this has been an expectation for some time with strategic customers, this is becoming a basic service offering for customers in all segments. The challenge is how to automate to cover those requirements for smaller volume customers. Overall customers are asking for more activities that they want to push to vendors."

Dealing with greater complexity and developing enhanced responsiveness

For at least one of the firms in our sample, consumer response to the pandemic resulted in: "a jump in retail e-commerce from a little less than 10% to more than 30%. That increase in volume has exposed delivery capability vulnerabilities in the retail ecosystem. Time definite delivery expectations have been the competitive equalizer between e-commerce and brick-and-mortar retailers. While e-commerce retailers still have an assortment advantage, many have lost the availability and lead time advantage."

The COVID-19 pandemic presented the ultimate stress test for business operations, especially as many traditional B2B channels shifted—out of necessity—to incorporate a B2C channel often within a very short period of time. Business operations will continue to be complex but these kinds of rapid shifts escalate the level of complexity that supply chains are having to deal with in the B2C market due to the ramp up and sheer magnitude of small shipments and customer service expectations.

These different service expectations will not be limited to traditional delivery dimensions. Several interviewees commented on an expectation that customer needs and concerns will most likely experience a permanent shift: "Even when we get some type of normalcy back, customers will have changed." In particular, they will "have a heightened awareness of risks to their health." Businesses must determine how they "can support customers' needs for product, but also their well-being."

A number of suggestions were made including, fewer touchpoints in the order cycle, and, ideally no-touch deliveries and transactions. Given the expectation that the customer flight to digital and omni-channel commerce might be here to stay, firms have to recognize that e-commerce and digital channels equate to increased complexity.

One way to meet these new challenges is by developing new ways to serve customers in different ways than have been used in the past. As an example, one interviewee referenced Delta Airlines' response to lost sales and cancelled flights. "The difference in customer experience between March 2020 and October 2020 has been astounding," the interviewee said. "It took numerous phone calls, e-mails and six weeks to eight weeks of waiting in March. In October, it took one 10-minute phone call to make a cancellation. There has definitely been a trend toward adaptability in serving customers in different ways than in the past."

Communication is critical

Customers often are not only impatient; they are anxious. Therefore, communication is critical. Our respondents had a number of suggestions, including making it easy for customers to make contact, provide a one-time contact resolution and deliver immediate answers to e-mails and text messages. One person indicated that it is important to "show respect for customers' time. If you can't provide an immediate solution, customer service should call back when they can address the issues."

In particular, "efficient and effective feedback regarding order status is paramount. Customers expect heightened communication as to the status of their orders." They want "rapid service, high OTIF (on time, in full) and clear/timely communication. Product availability and on-time delivery are the most important customer expectations."

Technology and data

Communication in a multi-channel environment adds complexity. This may require adopting new ways to collect and exchange information, including live chat, video, apps, social media and communication through web sites. Our respondents also said that companies must be nimble, fast and advanced with technology to enhance the buying experience in the experience age. It is important to determine the appropriate balance between human interactions and automation. One respondent indicated: "We have invested heavily in helping customers learn about and utilize our products. This involved developing videos and using social media." Another added: "I fully expect social media and communication to play larger roles in both influencing buyers and assisting customers in how to fully utilize the products."

The importance of technology to enhance communication was summarized nicely: "While customer service has always been critical to the success of an organization, its significance has evolved to encompass communicating at every step within the chain. Information must be available on demand via the most efficient medium as dictated by the multi-channel user." While COVID may have slowed down the movement of goods to the customer, it was not an excuse to slow down the flow of information.

Another way that technology can be used to address changing customer needs is through the use of data for market sensing, with a focus on predicting changes and monitoring the environment. More companies are realizing the importance of gathering data for the early identification and projection of trends. Data is critical to supporting a customer-centric approach. We were told that "it will be important for companies to have more user data in order to offer personalization across the different touch points."

A recent *WSJ* story reports how Walmart, Amazon and other retailers employed the use of Artificial Intelligence (AI) to handle the post-holiday returns volumes by predicting customer returns cases where it was cheaper for the customer to retain the product, while still issuing them a refund. This is an example of what the writers Joe Ucuzoglu and John Hagel III discussed in a *Harvard Business Review* article in April 2020, writing: "Imagine customers who are not only willing to share their data with a company, but eager to share more of it. What would this take? Most fundamentally, customers would need to see that their data is being used for their benefit, in ways that they highly value. If that happens, they will be eager to share more about themselves to receive even more value. It's time for many organizations to ask themselves: How are the data about customers being used to help customers?"

To better understand customers' needs in this way, one of the companies we spoke with has developed a new team to focus on global as well as regional opportunities. "The people that are involved in the team are from different backgrounds, experiences and knowledge. Often the most innovative ideas come from combining two complete and opposite worlds."

The elephant in the room: Amazon

A number of people cited the need to compete with Amazon and the e-commerce giant's "unquenchable thirst for delivery on demand." Speed to market on new products and particularly on every day deliveries is judged by customers relative to Amazon-type timeframes. Customer loyalty can quickly fade. As one respondent put it: "If consumers don't get the products they are looking for, it seems they will go online to another retailer."

Many of our interviewees commented on the need to change in order to keep up. Even before the pandemic and economic crisis, traditional brick-and-mortar retailers had been struggling to compete with Amazon, as well as other e-commerce leaders. COVID accelerated these struggles, and perhaps suggests that businesses can no longer count on things returning to a post-COVID "normal." Interviewees mentioned drivers within the business environment that did not meaningfully exist several years ago, and that Amazon continues to make significant strides into the B2B channel. "Businesses now have to compete with those service levels to remain relevant," an interviewee said. "Furthermore, if manufacturers do not add value to products or services, they risk becoming irrelevant and obsolete as they will be offering only a commodity that can be delivered faster with an Amazon type approach."

Another respondent also remarked on the carry-over effect of the Amazon experience to the B2B market. "The remote nature of the past six months has dramatically increased everyone's reliance on being able to buy anything they want online and get it quickly and easily. This new expectation will crossover into the industrial product world, too. And many companies will need to find ways to simulate the Amazon experience with their product and service offerings." This is particularly significant when we consider that a recent McKinsey report that suggests that consumers are likely to maintain their pandemic-induced shopping behaviors beyond 2022.

It's not all bad news

To put the best possible spin on it, the pandemic has been a learning experience. Providing both an accelerator and stress test for firms willing to embrace and adapt to changing customer demands. Many firms did in a few weeks what would normally have taken them years to achieve: Implement a digital strategy with technological capabilities that enabled a rapid, meaningful e-commerce response. However forced it might be, learning is still learning and in some cases, offers firms the opportunity to crisis-proof their supply chains while capturing market growth in the midst of the pandemic. One of the most positive reactions is captured in the following quote: "The COVID situation also helped us learn more about the resiliency of our supply chain. Although the supply chain fared very well, we identified some areas that we could strengthen." Further, "Because our supply chain held up so well, we believe that we gained market share as volumes on several key products are through the roof. Adapting to unexpected demand is a problem, but a great problem to have."

Remember the basics

Our experts reinforced the idea of foundational requirements. The minimum requirement is good product availability and on-time delivery supported with timely communication. They believe that most customers are accepting of supply shortages, but that doesn't mean they lower their expectations as evidenced by this quote: "With spending more time at home, customers became stricter about quality. They pay more attention to how it arrives at the door."

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** "The New Age of Customer Impatience...." International Journal of Physical Distribution & Logistics Management, 2019. Vol. 49, No. 1, pp. 4-32.*

RETHINKING CYBERSECURITY:

HIDDEN VULNERABILITIES IN THE SUPPLY CHAIN

The most recent spate of cyberattacks on the supply chain and beyond should have everyone's attention. Here's a manageable scheme for protecting against cyberattacks by creating a system that provides equal protection from vulnerabilities to any and all suppliers regardless of their size.

BY ZACHARY S. ROGERS, THOMAS Y. CHOI AND SEONGKYOON JEONG

"They first went after our gas and then they went after our hot dogs."

That's Christopher Krebs' accounting of recent cyberattacks on Colonial Pipeline, the biggest U.S. fuel pipeline, and JBS USA, one of the world's largest meat packing companies. Krebs is the former director of the federal Cybersecurity and Infrastructure Security Agency.

He continued on to say to NBC: "No one is out of bounds here. Everyone is in play."

Just a day later, the Biden administration put cyberattacks on a par with terrorism. It also said that all companies large and small need to determine how to confront this threat to their operations and even future viability. That's a warning that Walmart, Target, Equifax and many others would double down on after surviving their own cyberattacks in recent years.

This is not a practice drill.

Three years ago, cyberattacks cost the world's companies upwards of

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$600 billion, according to the cybersecurity protection firm McAfee. Needless to say, cybersecurity has become an even bigger business lately, with the rate of attacks increasing during COVID-19. And some estimates of its cost have now hit the $6 trillion annual level. Quite simply, cyberattacks are an exponentially high-growth business.

With the increasing scope and proliferation of these attacks, it is all hands-on-deck at many firms. Other than IT, no individual department is more affected by these attacks than supply chain management. More than 60% of cyberattacks launched against publicly traded U.S. companies in 2017 were supply chain-based, meaning attackers launch their assaults at firms by first compromising one of their supply chain partners and then using them as a launching pad.

As supply chain networks become increasingly connected, it has become common for hackers to compromise one firm, steal login credentials to their supply partners' back-office systems and then breach the partner. And just as no company is out of bounds here, no supply chain partner is too insignificant to be the conduit for a cyberattack. Smaller firms are often targeted because they have fewer resources dedicated to cyber-defense, making them more susceptible to attacks. It doesn't even matter to the attackers that smaller suppliers may not have a large trove of customer information or valuable financial assets. Instead, and often more valuable, many possess login information that, if stolen, attackers can use to penetrate back-office systems of the larger firms with more resources.

In fact, the misperceived anonymity of smaller companies is an advantage in cybercrime because they are often viewed as relatively unimportant. This is counterintuitive for many supply managers. Traditionally, supply managers spend a disproportionate amount of time dealing with larger suppliers. They are incentivized to do this as they are often graded on KPIs such as cost savings and maintaining a steady stream of mission-critical components—both of which are often achieved by working with a few key suppliers. Ironically, this can come at a cost of paying less attention to smaller, non-critical suppliers, inadvertently opening the door for cyberattacks through these neglected supply chain partners.

Unfortunately, if hackers are able to breach a firm's systems through its supply chain, the consequences can be large no matter which supplier was vulnerable. In other words, a breach of a $6 million supplier presents as much risk as one 100 times larger.

While firms must work to prevent these attacks, it is unrealistic for supply managers to closely monitor every small supplier—there has to be a better way. And there is. Following is a framework that allows companies to protect themselves from the cyber-vulnerabilities associated with smaller suppliers, without spending an inordinate time monitoring them.

Assessing the current situation

One of the largest cyberattacks in history was the breach of Equifax in 2017. Hackers were able to infiltrate Equifax's back-office systems when a small, third-party contractor failed to update a vulnerable system for two months after the release of a security patch. By breaching the third-party software operated by the Equifax supplier, attackers entered Equifax's system and compromised sensitive information of approximately 150 million people.

It is unlikely that Equifax had significant oversight of the timeliness of software updates performed by their suppliers. However, they were held fully responsible for the failures of their suppliers, as they were ultimately required to pay up to $700 million in damages. Yes, there are consequences beyond service disruptions and exposure of confidential information in cyberattacks.

One of the major issues Equifax faced with this breach was the lack of transparency it had into the activities of its supplier. The supplier at fault was an individual contractor. It would be unusual for the supply management team of a large company like Equifax to devote significant resources to the monitoring of such a small supplier. This is partially because many supply management teams engage with vendors through the paradigm of a strict A-B-C supplier hierarchy.

Conventional wisdom can hurt

Suppliers are often grouped into A, B or C categories based on the level of spend dedicated to each supplier. A-B-C classification also allows supply managers to operate under the classic 80/20 rule, devoting the majority of their time to a limited number of key suppliers.

The general rule of thumb is that the 10% to 20% of suppliers representing the top 80% of a firm's spend are classified as A-level suppliers. C-level suppliers at the other end of the spectrum encompass those with which a buying firm has an insignificant or non-mission critical volume of spend. Examples might include a small regional janitorial contractor, or IT subcontractors.

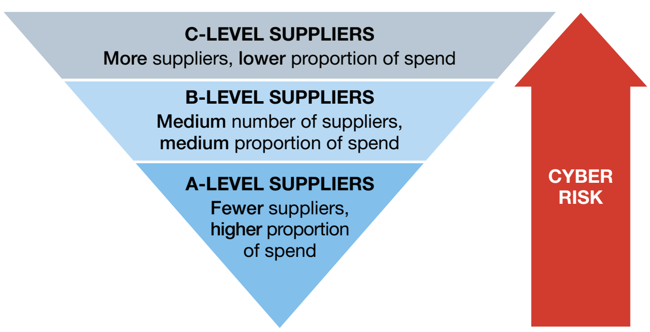
As would be expected, A-level suppliers get the most attention while minimal time and resources are dedicated to C-level suppliers. For example, one would expect Walmart's supply managers to spend significant time and resources working with vendors such as Mattel or P&G. However, it would be atypical if they were to allocate similar resources to a small regional supplier. Cyberattacks, however, are changing that equation more than just a bit.

The expected return generated from investing time and resources into a larger, more important supplier greatly outpaces the return one would expect to gain from making a similar investment in a smaller, less mission-critical supplier. The difference in expected return on investment is exacerbated by the fact that firms tend to have exponentially more B-level or C-level vendors than they do A-level suppliers. For new product development, supplier cost savings and many of the other KPIs supply managers are graded on, the focus on A-level suppliers makes sense.

Unfortunately, the opposite is true for cyberattacks. As presented in the figure below, C-level suppliers tend to be the most vulnerable to cyberattacks, and supply managers ignore them at their own peril.

FIGURE 1

C-level suppliers and cyber risk



Source: Authors

While the limited resources of smaller, C-level suppliers mean that they often account for the largest supply chain cyber-vulnerabilities, it is not feasible for supply managers to closely monitor every supplier. Does that mean companies are doomed to be continually at risk with no recourse except resource-intensive monitoring of smaller suppliers? Fortunately, we believe the answer to that question is no. By working with the internal end-user of supplier products/services as well as the IT department, supply managers can establish a cyber-A-B-C classification system that focuses on the level of information access depending on the importance or function of the supplier.

Build a cross-functional team

Getting started here requires a couple of key steps. The first is to build a cross-functional team capable of determining the level of access to electronic data that a given supplier requires to fulfill its contract. The second is to build a cyber-A-B-C classification system that the team uses to protect the company's back-office network. The expected outcome of both steps is to limit or even eliminate the potential risk of a successful cyberattack on critical company IT systems and information. Getting there requires some work, however.

Let's start with the team. In the past, supplier cybersecurity has been thought of as the domain of IT alone. However, the permissions between firms, and the potential vulnerabilities those connections make possible have complicated this process to the point where a cross-functional team is required to properly address the situation.

The team should include representatives from procurement/supply management, IT, compliance, and the internal end-user of the project or service being procured. Including the end-user is important as they can help to set the initial expectations for what the supplier will be providing to the firm and what sort of digital permissions they will need to meet these expectations. From there, IT can set these permissions and update them if requirements change at some point in the future. The representative from compliance will ensure that the contractual standards the supplier is held to are in accord with both the industry and regional requirements for cybersecurity (such as GDPR in the European Union).

This should all be done in conjunction with the supply manager charged with managing the account of the supplier in question. The supply manager who is responsible for the supplier in question should take ownership of the overall process. This ensures that each supplier is granted appropriate permissions, and that the supplier evaluation process is reflective of the recommendations made by compliance.

When it comes to building an A-B-C classification system that will lead to improved cyberattack protection, think of the company as a house. This approach is the equivalent of limiting the rooms in the house that a contractor working on the house is allowed to access. If a plumber is there to fix the kitchen sink, is there any reason to be wandering into a bedroom? Why then should it be any different in limiting the access that smaller, potentially vulnerable suppliers have to sensitive areas such as point-of-sale (POS) systems or customer records? The simple answer is none. But many companies have not taken the steps to limit permissions, and too many plumbers wind up in the bedroom.

At a company, it may make sense to allow larger vendors to access the buying firm's inventory for replenishment or

R&D systems for product development purposes. In other words, an A company should have A-level access to the buying company's systems. However, B- and C- level suppliers typically don't require such broad access and should be walled off from those areas for two reasons. One, they just don't need such access to fulfill their contract. And just as importantly, this limits to a degree the potential of a cyberattack.

To enforce these limitations, it is crucial for companies to employ defense-in-depth and back-office segmentation. Defense-in-depth refers to the practice of building redundant firewalls into a system. This way, even if one portion of the system is breached, others are still protected by additional layers of defense. Continuing the analogy of the house, defense-in-depth is akin to placing locked doors between each room, each of which requires a different key. Defense-in-depth seems to have been one of the keys to mitigating the impact of the previously-mentioned JBS breach, as very few of their core critical systems were compromised—allowing them to resume operations faster than had been anticipated.

By taking time in the contracting process to grant the proper permissions to each vendor, supply managers ensure that suppliers only possess the keys they absolutely need. Even if smaller C-level suppliers are compromised, an attacker will not be able to steal every key necessary to infiltrate the buying firm's most valuable systems.

Who gets what permissions?

When deciding which permissions to grant to each vendor, the supply manager and the cross-functional team should consider three key factors: mission criticality, cyber-compliance and constant monitoring and updating of the scheme in place.

Mission criticality determines which pieces of the back-office system a supplier needs to access to so it can fulfill its contract mission. Quite simply, only vendors with clear reasons to access sensitive systems should have access to them.

For example, it is reasonable for a payment card supplier to have access to the POS system that retains customer credit card information. But that's not the case for all contractors. As Target discovered when it was hacked in 2013, there was no reason for a regional HVAC supplier to have access to the corporate POS system. More on that later.

If there is no need for suppliers to have access to vulnerable systems, their permissions should be strictly limited if not outright denied. To continue the key analogy, they may be provided with a key to the front door, but none of the specific rooms.

Once it has been established that a vendor has a mission-critical reason to access sensitive systems, they should also be required to exhibit some minimum threshold of cybersecurity. While some buying firms may prefer to develop their own specific cybersecurity requirements, they can also rely on many international and industry standards. Following is not a complete list, but it is one to consider as a starting point.

ISO 27000, ISO 27001 and ISO 28000 are all widely used and accepted international standards regarding cybersecurity. They include guidelines regarding the management of financial information, intellectual property, employee data and other potentially sensitive information.

Among the ISO guidelines, ISO 28000 applies specifically to supply chain cybersecurity, incorporating explicit guidelines regarding transportation and manufacturing. ISO 28000 should be used to establish supplier guidelines for transportation and other logistics suppliers.

Meanwhile, ISO 27000 and 27001 are international standards dictating the proper management of information security and management.

These and other ISO guidelines are internationally recognized, and can be especially useful for companies with international suppliers as they can be applied fairly broadly. It's worth noting there are also country-level guidelines such as the National Institute of Standards and Technology (NIST) in the United States and the General Data Protection Regulation (GDPR) in the European Union.

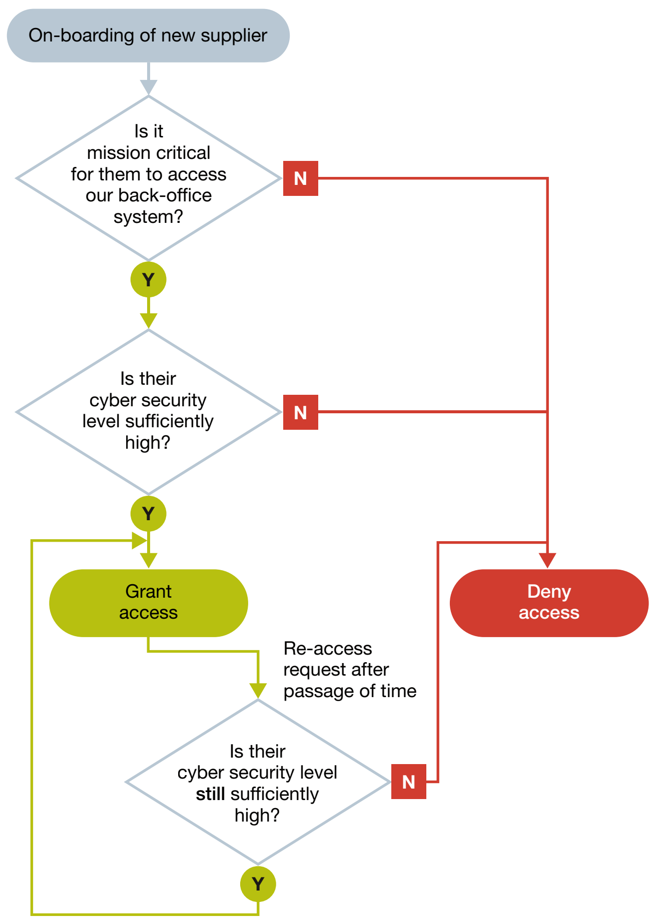
Finally, several industry-specific cybersecurity standards also exist. Some of these key industry guidelines include: Advanced Notice of Proposed Rulemaking (ANPR) for U.S. financial institutions, Defense Acquisition Regulations System (DFARS) for U.S. defense contracts, IASME for small-to-medium enterprises in the UK, North American Electric Reliability Corporation (NERC) for U.S. energy firms and Payment Card Industry (PCI) certification for point-of-sale systems that will be accepting U.S. credit or debit cards.

There's also the issue of constant monitoring and updating of the system that has been built. Cyber-criminals have time on their side. They continuously develop new methods of penetrating defenses. As their tactics continue to evolve, it is paramount for companies to ensure that both their own defenses, as well as the defenses of their supply chain partners, are always cutting-edge and ready for the latest attacks. In fact, that is exactly what the Biden administration was talking about in early June.

As mentioned earlier, the failure of Equifax's vendor's defense system was attributed to a two-month lag in properly updating and patching systems. Supply managers should use third-party auditors to test their cyber-defenses of A-level vendors with access to the buying firm's back-office systems. This testing might include so called red-team attacks, in which a third-party auditor acts as an attacker and attempts to penetrate a vendor's cybersecurity. This type of test provides crucial information regarding potential vendor vulnerabilities. However, they are also resource-intensive, and it is not realistic to pay for red-team attacks to be launched against all suppliers.

FIGURE 2

Decision tree



Source: Authors

This is why it is crucial to limit the access non-critical B-level and C-level suppliers have to the most sensitive systems. While it is still important to monitor their defenses, it would not be realistic to carry out complex audits for smaller, albeit more vulnerable, supply chain partners. By shutting suppliers out of vulnerable back-office systems that they do not have legitimate business reasons to regularly access, supply managers can significantly curb the number of vendors that would merit this type of in-depth audit.

Supply managers should dedicate the majority of their time and resources earmarked for supply chain cybersecurity to vendors that have access to higher-value systems. By employing defense-in-depth and back-office segmentation, supply managers can once again turn their focus toward A-level suppliers—even when it comes to cybersecurity.

The value of the right defense

The hack of Target in 2013 was an excellent example of the value of building a cyber-A-B-C classification scheme as well use of defense-in-depth, back-office segmentation.

Target was compromised through their regional HVAC supplier Fazio, a small supplier of heating and air-conditioning services to Target stores in Ohio, West Virginia and Pennsylvania. Fazio epitomized the classic C-level supplier.

The service it provided was not mission-critical for Target customers (few come to Target for the ventilation), and they did not account for a large volume of spend. Even so, Target allowed Fazio to have nearly unlimited access to its back-office system, including the POS system.

Cyberattackers were able to penetrate Fazio's meager defenses (which included the free version of its anti-virus software), steal login credentials to Target's system and move unimpeded throughout Target's back office. This compromised the credit card information of 110 million customers, resulting in fines of approximately $162 million.

However, there is evidence that Target could have avoided this had it followed the recommendations laid out here. Fazio also counted many other large firms, including Walmart, among its customers. At the time of the breach, Walmart utilized defense-in-depth segmentation and required redundant logins to reach each segment of the back-office system. As a result, Fazio did not possess the credentials to reach into Walmart's most vulnerable systems, and the potentially very damaging incursion came to nothing. The supplier breach that cost Target $162 million cost Walmart $0. Walmart is proof that by following the steps presented here that firms can greatly reduce their exposure to cyberattacks through the supply chain.

Supply managers are dealing with a whole new world of risks with supplier cybersecurity. There is no reason to make these more complicated by opening themselves up to attacks from loosely monitored C-level suppliers. By following a well-considered scheme that puts every contractor in its respective place, every company's cyber-house can be as safe as possible.

THE FUTURE OF WAREHOUSING

The four cornerstones of competitive advantage

BY ARUN KOCHAR, SUMIT CHADHA AND ARPIT SHARMA

Anytime, anywhere fulfillment. Next-day, same-day and even same-hour delivery. Exploding product variety and packaging choices. Hyper-localization. Personalization. Welcome to the age of omni-channel fulfillment, with its promise to serve every single consumer with what they want, when they want it—and how they want it.

For retailers and manufacturers alike, the consumer's ravenous appetite for speed and choice is making warehouses and distribution centers (DCs) much more central to the competitive equation. Yet most fulfillment operations were designed for a far less challenging era. This stark reality obliges chief executives and chief operating officers to actively envision the larger, more nuanced and more strategically vital role warehouses and DCs are playing in their future supply chain today—and will certainly play tomorrow. Fulfillment capabilities must now be counted among top strategic priorities for executive teams. Without question, those who ignore the future of warehousing risk repeated crises, challenges in meeting customer expectations, expensive work arounds and rushed retooling of this increasingly crucial link in the supply chain.

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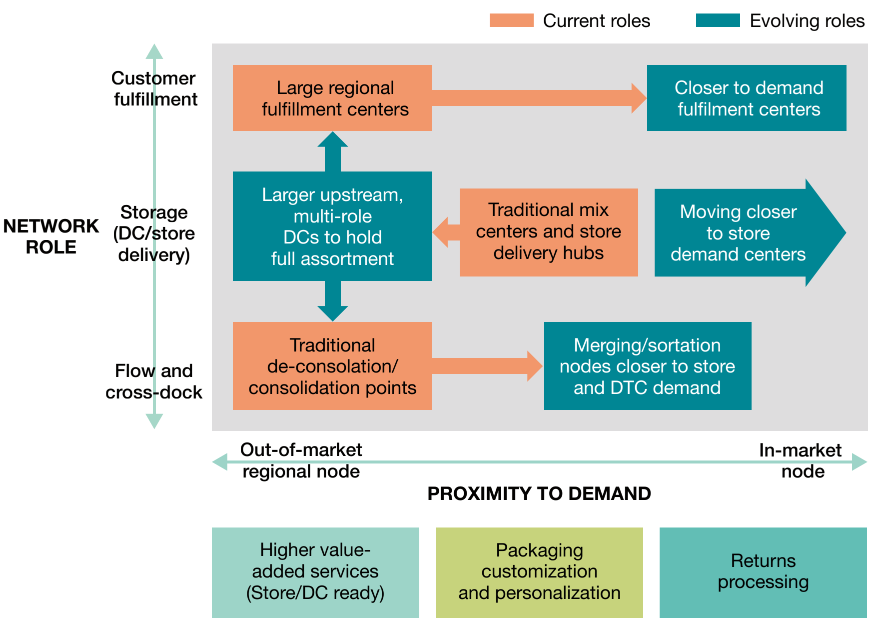
We see the requisite shifts unfolding along two dimensions in the distribution networks: 1) design and build facilities with capabilities suited for more complex and diverse network roles such as store delivery, customer fulfillment and cross docking and 2) position fulfillment nodes much closer to demand centers with forward deployed inventory (see Figure 1).

FIGURE 1

Distribution network dimensions



Source: Kearney analysis

The implied investment is substantial, yet strategically imperative. The question is: How quickly should you proceed, in which dimension and on what scale?

Tradeoffs between capex and opex are at the core of your decision. Aggressively investing capital now can substantially lower your ongoing operating costs and strategically position your company to differentiate its service to consumers. Successful companies will free themselves from philosophical constraints to find the optimal balance for capital allocation. For example, companies with existing or growing scale will choose to invest themselves via modular and scalable network solutions, while others may choose to partner with or leverage fulfillment providers. Another key is striking the right balance between investing in response to immediate pressures (which are substantial) versus investing to get ahead of the curve, to build a future competitive edge.

Imperatives: capability, resilience, efficiency

Defining your best path forward demands a comprehensive view that encompasses three interrelated imperatives: capability, resilience and efficiency.

Capability. In an increasingly competitive marketplace that places a premium on offering consumers an array of options, at warp speed, warehouses and DCs must be prepared to meet a complex array of new product-handling and delivery requirements. The warehouse of the future will be capable of:

- slotting one time to two times more SKUs;
- omni/multi-channel under one roof;
- pick fragmentation (higher case and each picks relative to pallet pick);
- higher order line complexity and pronounced peaks; and
- higher in-DC value-added services.

While retailers are at the forefront of adapting for these, pressures are cascading upstream to manufacturers and suppliers with higher-order complexity, higher service needs and stringent product-handling requirements.

Resilience. Most leading companies now draw on an intercontinental supply base, and these sourcing strategies have generally delivered the expected cost efficiencies. Unfortunately, this approach also brings increased exposure to disruptions, as has been vividly demonstrated by the recent spate of trade wars and the COVID-19 pandemic. These events revealed the underbelly of Lean, as companies were caught with a limited store of inventory, low latent capacities in network and few viable alternatives.

Fulfillment operations can also be vulnerable to system outages and cybersecurity, as well as high personnel turnover (often running at 50% or more), a consequence of wage-driven poaching of warehousing/DC personnel.

Clear evidence of resilience and capability build is evident in how major grocers are responding to online demand surge, only further amplified by the pandemic. Kroger, Albertsons, Ahold, Meijer and Target (among others) are rapidly exploring micro-fulfillment centers (MFCs) or adapting their brick-and-mortar store space, dedicating store back rooms and urban warehousing space to online order fulfillment. Some also created new "dark stores" with no retail space for customers. Such expediencies appear to have been a harbinger of a larger and more permanent shift. Target has found that shipping from nearby stores is 40% less expensive than shipping from remote DCs, while a majority of the stores in Walmart's recent multi-billion-dollar Canada investment will have dedicated MFCs in the backrooms.

To become more resilient, the warehouse of the future must be built for:

- multi-node connectivity and fulfillment flows;
- real-time inventory visibility and traceability;
- multi-role flexible workforce;
- optimally selective materials handling automation; and
- intelligent latent capacity (shared or with logistics partners).

Efficiency. The previous two imperatives will make it all the more challenging for supply chain networks to remain competitively cost efficient. Omni-channel is growing, often with a three times to five times increase in cost to serve. Everyone is feeling the sting of direct-to-consumer costs. And the innovations required to build resilience and capability will carry their own price tag. While certain "at scale" omni-channel shippers are proceeding toward volume thresholds that allow better four-wall economics, the challenge remains for the majority of the warehouse operations designed for traditional channel fulfillment. For these reasons and more, leaders must sustain an intensive focus on ensuring their fulfillment network operates seamlessly, and at a competitive cost.

The warehouse of the future will be built to:

- apply automation to achieve scale faster, at lower thresholds;
- systematically optimize pick efficiencies;
- deliver shorter payback while maintaining optionality to change course; and
- provide modularity in builds, to allow stair stepping capex versus putting it all up front.

Foundations: technology, personnel, orchestration and platform

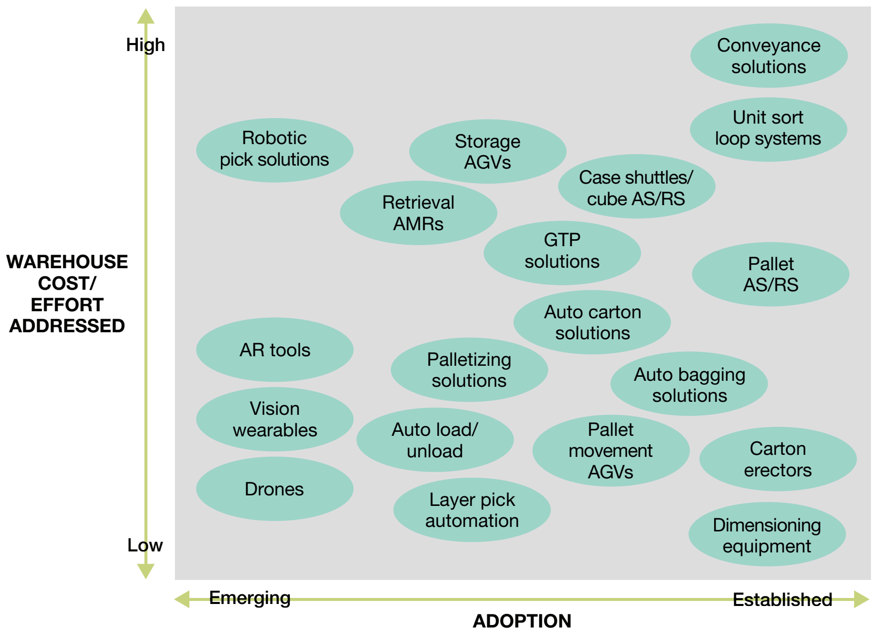
To address these strategic imperatives, you will need to build four cornerstones of future competitive advantage: technology, personnel, orchestration and platform. As these are highly interconnected, we advise senior leaders to address them concurrently, toward developing an integrated blueprint for best outcome and prioritized investment.

Technology for the future. Technology is obviously central to the future of warehousing—particularly the mechanization and automation of materials handling equipment systems. Yet one still sees a lot of manual operations in warehouses. And companies are still working to clarify which "fit-for-purpose" portfolio of point solutions will yield the most value for their business and customers. An ideal warehouse of the future will rarely have all innovative point solutions activated, but rather a custom selection that fits the need at each step—receiving, put-away, store, pick, pack, sort and DC control.

Broadly speaking, technology investments in warehouses and DCs will be driven foremost by their potential to increase productivity, with the added goals of ensuring business continuity and enhancing customer-centric capability (see Figure 2).

FIGURE 2

Evaluating select MHE solutions



Source: Kearney analysis

A future-focused technology strategy for warehouses will address:

- the capability imperative, by reducing receiving and outbound cycle times, and delivering dense storage with capacity for higher assortment;
- the resiliency imperative, by reducing exposure to personnel shortages and high turnover; and
- the efficiency imperative, via reduced cost to serve and transportation utilization.

Personnel of the future. As technology applications advance, you must fundamentally reassess what you require from warehouse personnel—for instance, increasingly skilled and adaptable associates who think like your customers. When pondering this challenge, we suggest you recognize that many if not most of your current associates view their warehouse roles as transitionary, rather than as a career path. No doubt wage and benefits will be a critical factor, but schedule flexibility, clearer sense of purpose and task ownership will start to weigh in heavily.

A future-focused talent strategy for warehouses will address:

- the capability imperative, by developing, motivating and focusing personnel on meeting increasingly aggressive delivery promise and fill rates;
- the resiliency imperative, via personnel policies that balance costs with considerations of business continuity (especially reducing turnover); and
- the efficiency imperative, through hiring, training and management processes intently focused on labor productivity and lowering transition costs, nurtured by a culture of continuous improvement.

In fact, the future of warehousing will demand a deep retooling of talent strategy and its underlying structural assumptions. The goal is to engender a more flexible workplace (via customized schedules); develop an on-demand, always available workforce (via increased use of gig staffing and on-demand staffing platforms); and improve employee retention and sense of purpose (via updated incentive structures and a balance of tangible and intangible perks).

Orchestration for the future. Recognize that market winners will differentiate on digital and execution capabilities as physical asset capabilities start to achieve parity. The key is to orchestrate your assets—whether owned or shared—to optimize end-to-end fulfillment. While functional focus lends itself to independently optimize four-walls operations, transportation and replenishment planning, supply chains will need to engender an “optimize for the whole” intent, at times sacrificing siloed efficiencies.

A future-focused orchestration strategy for warehouses will address:

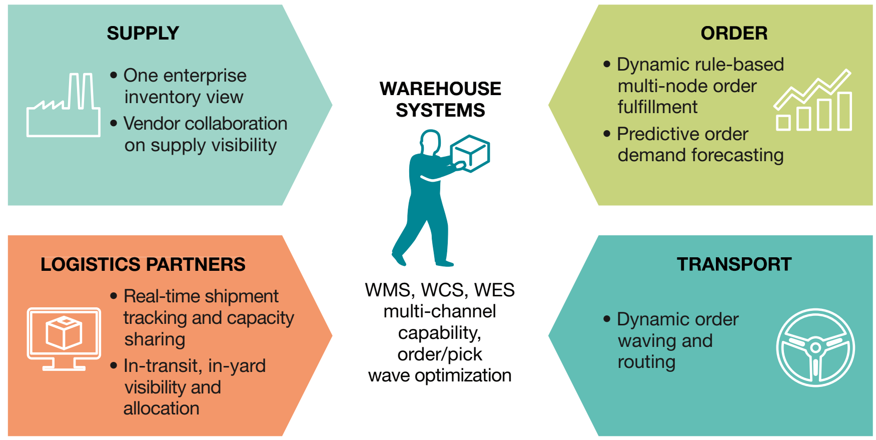
- the capability imperative, by meeting higher promise and service levels on retail and consumer orders;

- the resiliency imperative, with rapid response via alternative flows and visibility; and
- the efficiency imperative, via optimized receiving, storage, picking and workforce productivity.

Specifically, we suggest scenario planning to simulate tradeoffs on service, cost and capacity, as well as deeper integration, visibility and collaboration with logistics partners (see Figure 3).

FIGURE 3

Visibility and collaboration with logistics partners



Source: Kearney analysis

Platform for the future. To deliver a broader range of capabilities, far more flexibly, companies can explore shared supply chain partnerships, thus enabling resource sharing with non-competitive peers. Inherent challenges remain in such setups, but the case for sharing platforms offers a range of compelling opportunities to build scale rapidly and monetize asset capacity and capabilities via a platform vision (see Figure 4).

A future-focused platform strategy for warehouses will address:

- the capability imperative, with steps to access on-demand peak capacity and develop at-scale DTC capabilities;
- the resiliency imperative, by developing contingency options to share space during outages, build seasonal capacity pool and share workforces as the need arises; and
- the efficiency imperative, by designing plat forms explicitly to achieve operational scale in ways that meet rising customer demands, with lower cost to serve.

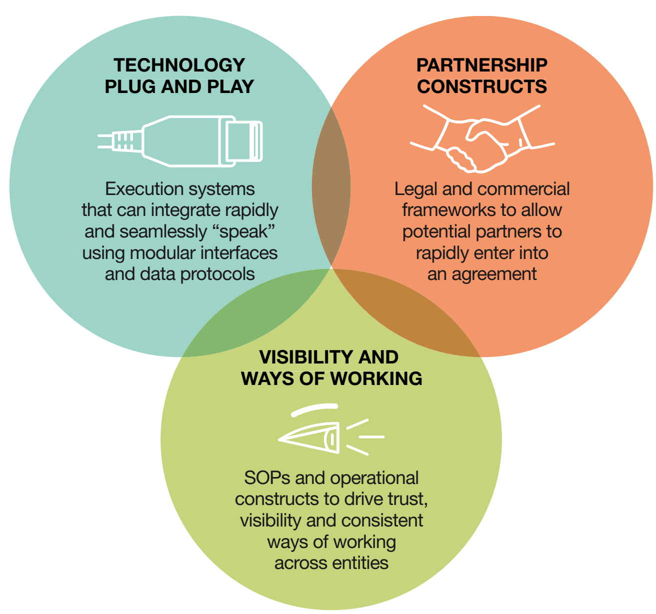
Whatever the means, the end goal is to have platforms that can nimbly and cost-effectively adapt to new, more complex and ever-changing requirements in terms of order sizes, mixes and schedules. Companies may also want to monetize some current assets by offering fulfillment services.

Your path forward

There are many paths forward, each with its own pros and cons. If top leadership teams engage in an objectively informed exploration of their options, they will likely find their way to success. Those who ignore the future of warehousing risk repeated crises, challenges in meeting customer expectations, expensive work-arounds and rushed retooling of this increasingly crucial link in the supply chain.

FIGURE 4

A platform vision across shippers could unlock value



Source: Kearney analysis

How platforming builds a more resilient supply chain

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By Caitlin O'Keefe, Bharat Kapoor and Namrata Shah

COVID-19 has exposed just how easily supply chains can buckle under pressure. The fragility of globalized supply chains was on full display in the spring of 2020 as exasperated shoppers stared at empty shelves while manufacturers struggled to meet demand for everything from baking flour to bicycles. Many of the worst pandemic supply chain disruptions, including border closures, plant shutdowns due to COVID outbreaks and ship backlogs at ports, have eased in recent months. However, new pressures from inflation and commodity shortages are heating up as demand for housing, electronics and consumables grows across the United States.

A supply chain is only as strong as its weakest link, so operating in a post-COVID world requires a comprehensive approach to managing risk across the entire network. Complexity is the Achilles heel of the supply chain and companies with complex product portfolios inherently have more potential points of failure throughout their networks. Given the lessons of the pandemic, many companies are recognizing that managing complexity starts with design and they are turning to portfolio platforming as a key tool for simplifying their supply chains and building supply chain resilience.

Platforming is a design framework that leverages a common set of design, engineering and operational parameters and maximizes the use of modular or standardized components throughout the portfolio. Building off modular components accelerates innovation while enabling greater supply chain flexibility, particularly though postponement and late-stage customization. The goal is to enable variety where it matters (to the customer) while strategically minimizing its impact on the back end (in the supply chain). A well-executed platforming strategy reduces cost and risk across the entire value chain.

The cost of complexity

In the pursuit of growth over the past decade, companies have added new products to their portfolios at record speeds, largely driven by strong consumer spending, increased consumer demand for personalization and an expanding number of channels for shopping. Simultaneously, many have also been slow to exit legacy products, fearful of jeopardizing consumer loyalty or losing shelf space to competitors.

For some, this has created crippling complexity. For example, the line of fishing reels produced by a manufacturer of leisure sporting goods ballooned to 10,000 retail SKUs across hundreds of design platforms. This company, like many others, heavily indexed on innovation to drive sales; however, because nearly every reel was redesigned from the ground up, each new SKU drove the rampant proliferation of materials and components. This complexity required significant time to manage and added costs throughout the supply chain. Furthermore, portfolio management became increasingly cumbersome, which eventually slowed down their new product development cycle.

Why other solutions are inadequate

Efforts to address complexity are often superficial and may fail or only be partially successful because they focus on the symptoms of the issue rather than the root cause—the product portfolio itself.

SKU rationalization is a common approach for addressing portfolio complexity by trimming slow-moving or margin-dilutive SKUs. Unfortunately, this approach is frequently pursued ad hoc, which may leave the portfolio unbalanced. Complexity is also like the Hydra. Chopping off the tail in one category may cause it to regrow elsewhere. Finally, cutting out the dead wood often addresses only legacy, low-volume SKUs that are sitting in warehouses as inventory. These SKUs are rarely the ones causing operational challenges.

Component harmonization consolidates components that have similar specifications. However, these efforts are inherently limited because once something is designed in, it becomes difficult to harmonize at later stages.

Supplier consolidation can be an effective sourcing strategy to improve economies of scale. However, this needs to be executed carefully because over-consolidation can trigger business continuity risks that outweigh the benefits gained. Furthermore, even when done well, this approach only fixes the symptoms of complexity, not the cause.

Platforming future-proofs your portfolio

Because traditional efforts to reduce complexity fall short, a better approach is needed. The goal should not be to eliminate complexity entirely, but rather to find a way to support "smart innovation" through design. Platforming allows companies to customize a wide range of items by drawing from a shared set of thoughtfully crafted modules.

Think of product design platform like Legos. The modular blocks are standardized, but they can be configured billions of ways to create everything from a dinosaur to a life-size Bugatti.

We worked with a personal care company that had thousands of caps and bottles in different sizes, shapes and materials, many of which were off-the-shelf designs. By thoughtfully platforming their packaging designs and adding digital printers to the end of the filling lines, they were able to postpone customization of the bottles and drive significant supply chain efficiencies, including consolidating suppliers, lowering packaging costs and reducing inventory.

Platforming is also more than just a means to support portfolio variety effectively—it's a hedging strategy. Every company aspires to design a customer-centric portfolio, but it's largely impossible to predict the volumes of every variant and the trends of tomorrow. By using interchangeable components with platforming, companies are less likely to be locked into one design and can instead easily reconfigure new products based on consumer needs.

The principles of platforming

Some of the companies we work with initially believe they have platforms, but they may not be fully realizing the leverage inherent in true platforming. We've seen several enablers that are critical to achieving true platforming success; they are as follows.

• **Standardization.** To scale platforms, companies need to adopt a design philosophy that is centered on standardization. This need means having standard physical and digital interfaces to enable interchangeability or interoperability across products. This also means having well-defined standards for components, for example, common materials, material grades, colors, chipset architecture and ecosystems. Sometimes standardization increases costs at the SKU level, but still yields significant benefits at the portfolio level.

• **Leverage commercial off-the-shelf (COTS) technology.** There are advantages to leveraging COTS technology as part of platforming. This reduces upfront development cost, reduces certification costs and often accelerates time-to-market.

We advise engineering teams to avoid falling into a "not invented here" mindset, which often leads to spending unnecessary time reinventing commercially available technology.

• **Build as you fly.** A common misunderstanding of the platforming approach is that it requires a substantial ground-up development effort and has a very long payback. However, when done with rigor and focus, results can be realized in months, not years.

Companies should resist the urge to build out the entire platform library before the launch of new products. Instead, they should build the platform elements needed for select products, launch these products and then continue adding additional platform elements later. Furthermore, platforming should not be limited to new products. We frequently help companies platform products that are out on the market during product refresh cycles.

Strike a balance

Designing a balanced portfolio through platforming is only half of the challenge. It's equally important to maintain discipline and prevent the process from unwinding over time. Following are five key requirements to sustain the benefits of platforming.

1. **Platforming mindset.** The organization must shift from a "pure product" mindset to a platform mindset. This requires a change in thinking from "we have to build..." to "how can we use…?" This mindset starts at the most senior executive level and should then be cascaded through the organization.

2. **Governance.** A cross-functional council should oversee portfolio decisions and set parameters for the introduction of new products. The council monitors technology and component proliferation, challenges the team to use existing platform elements and follows a structured approval process before adding new assets to the platform library.

3. Organizational adaptability. Platforming is not just an engineering effort. It requires close collaboration with sales, marketing and supply chain. The engineering team must pivot from being product focused to being platform focused and they should be keyed into business insights that will influence design choices. This includes consumer insights from marketing, retail insights from sales and supply market insights from procurement.

4. Marketing buy-in. Leaders in platforming have marketing teams that embrace platforming and leverage it to reinforce brand identity. Apple is a great example. They use common materials to create a clean, visual identity across their portfolio. We recently worked with the marketing team of a beauty company to platform their packaging, which included harmonizing components and moving to recycled materials across the portfolio. This both lowered costs and achieved sustainability goals.

5. Platform library. All available platform elements or assets should be codified in a library to facilitate reuse across the organization. Elements should include technical documentation, interface rules and even the names and contact details for the module "owner."

Platforming, like any other approach, involves trade-offs. A platform naturally limits choice because it predetermines certain variables such as product components or dimensions. However, when the modules are thoughtfully designed, these constraints can be effectively managed. A successful platforming strategy strengthens choice for the consumer while optimizing flexibility, costs and risk for the company. The end result is a win for the top line and the bottom line.

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AI is driving new skills in supply chain

Organizations should respond by offering employee learning opportunities.

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

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New and emerging technologies are changing the way supply chains operate. The importance of technology on supply chains continues to increase with the many recent external changes affecting supply chains, such as the pandemic, supply shortages and security threats. Among the technological developments making an impact on supply chain is artificial intelligence (AI), which can help supply chains make more accurate predictions and thus make more informed decisions.

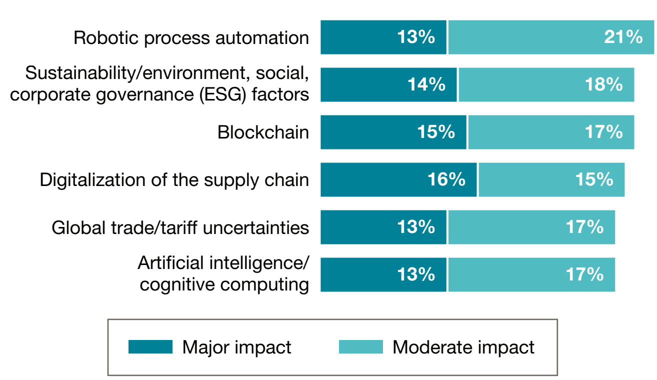
AI has the potential to assist with all aspects of the supply chain, from the ability to create self-adjusting supply chain plans to enabling manufacturing operations to self-optimize processes. In fact, in research conducted by APQC, AI is among the top six trends expected to make a significant impact on supply chains by 2023 (see Figure 1).

With many organizations seeing AI as integral in the future, businesses must consider how this technology will alter their staffing needs and the skills needed by their supply chain employees. After all, with better predictions and recommendations will come the need for employees who can make smart decisions based on that information.

APQC's research examined the current level

FIGURE 1

Top trends anticipated to impact supply chains by 2023



Source: APQC

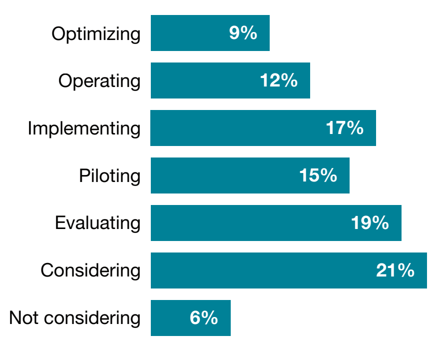
of AI adoption among organizations and how the technology is changing the skills required of employees. Smart companies are dedicating time and resources to getting their employees training and development they need for reskilling. This effort is essential to preventing skills shortages as the supply chain field continues to evolve.

AI adoption

Although AI has the potential to make a profound impact on supply chains (and often does among organizations that have fully adopted

FIGURE 2

Degree of AI adoption



Source: APQC

the technology), its use is not yet widespread. For those using AI, it is still relatively new to their everyday environment. APQC's research indicates that only 13% of organizations using AI have been doing so for more than two years. A larger number have adopted the technology only recently—36% have had it in place for less than one year. Further, about half have used AI for one year to two years.

Figure 2 shows the degree to which supply chain organizations have adopted AI overall. Almost half of organizations have not yet piloted the technology. Only 38% of organizations have moved beyond the piloting stage. Currently 21% of organizations are still considering the adoption of AI, although this number seems poised to change given AI's status as a top trend affecting supply chain.

Interestingly, these percentages do not change much when looking at the degree of adoption for specific segments of the supply chain. For logistics and warehousing, only about 39% of organizations have moved beyond the piloting stage of AI technology. This indicates that organizations recognize the wide-ranging applicability of this technology for supply chain use, but it also means that its impact on employee skills is also wide-ranging.

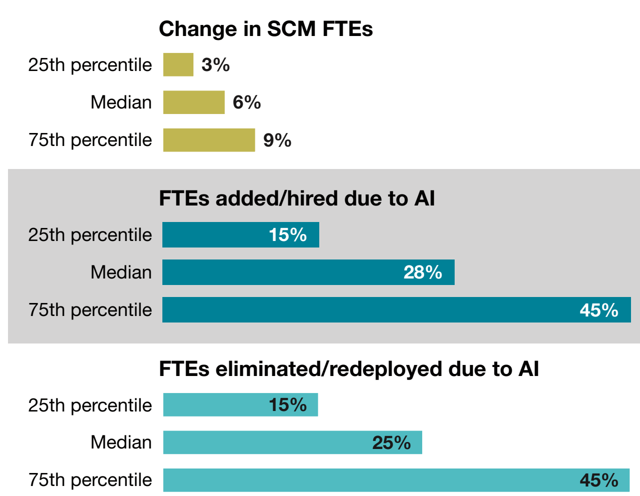
Impact on employees

Many organizations believe that AI drives value through its impact on the number of employees needed for the supply chain. Of the organizations surveyed by APQC, 46% consider a reduction in headcount to be a top driver for deploying AI. A similar amount, 44%, consider headcount redeployment to be a top driver. As AI takes on more tasks previously completed by employees, organizations expect to be able to reduce the number of employees working in supply chain or redirect their skills to other areas.

However, as shown in Figure 3, organizations

FIGURE 3

12-month change in supply chain full-time equivalent employees (FTEs)



Source: APQC

have not seen much churn in their supply chain employees. At the median, they have only seen a 6% change in the number of full-time equivalent (FTE) supply chain employees over the last 12 months.

Perhaps even more interesting is the fact that, at the median, organizations are actually adding more FTEs as a result of AI than they are eliminating or redeploying. At the 25th and 75th percentiles, there is no difference between the percentage of FTEs added due to AI and the percentage of FTEs eliminated or redeployed.

This is counterintuitive to the widespread expectation that the use of AI will eliminate the tasks undertaken by some supply chain employees and thereby eliminate the need for these employees altogether. Rather than replacing employees, AI is changing the skills needed by supply chain professionals.

New skills needed

APQC has investigated the shift in skills needed among supply chain professionals. As a result of the adoption of AI, supply chain professionals are taking on tasks that require more social and deep work skills (or those enabling workers to focus intensely without distraction). AI and its resulting automation of tasks leaves the humans on staff to engage in work involving analysis and insight. Technology is no substitute for the relationship-building skills that support listening to stakeholders, communicating effectively with business partners, innovating and thinking strategically about how to approach challenges.

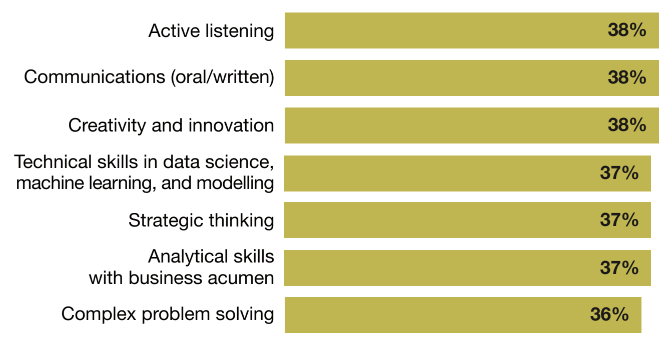
Figure 4 shows the top six skills organizations need their supply chain employees to develop or enhance as a result of the adoption of AI. Most of these are softer skills related to building relationships and solving complex problems.

Communication and active listening are among the most needed skills. Supply chain employees must be able to discern the needs of their stakeholders and business partners, maintain positive relationships with partners and succinctly and clearly convey expectations to suppliers and other service providers. Creativity and innovation are among the most important skills because of the shifting nature of the modern supply chain. With supply chains forced to address previously unheard-of situations and disruption, such as the global pandemic, professionals must be able to identify novel solutions to keep the business running.

Related to innovation and creativity is the ability to think strategically and solve complex problems. AI can use data to predict any shifts necessary for manufacturing operations and planning. However, the technology should support smart decision making and problem solving by employees. This is where the soft skills of employees become critically important. Supply chain professionals must be able to look at evidence and make the best decision for the business, especially in situations in which there is no evident "right" answer.

FIGURE 4

Top six skills needed as a result of the implementation of AI



Source: APQC

Despite the overwhelming need for strategic and relationship-building skills, supply chains still need employees with more technical skill sets, such as in data science and analysis. These skills are necessary to adopt, maintain and support AI within supply chain.

Other skills that more than one-third of research participants want to see employees develop or enhance as a result of the adoption of AI include: complex problem solving, the ability to extract insights from new technology or systems, and agility and flexibility to adapt to change.

Invest in employee learning

As the skills needed by supply chain professionals working with AI continue to change, companies are investing in training and development to help their employees keep up. It is reassuring to see that employees are not being left to fend for themselves when it comes to honing the new skills and capabilities needed. APQC sees that this support is true regardless of industry. At the median, organizations are investing in seven days of employee learning per employee to ease this transition.

Organizations are also adjusting their learning budgets to ensure that their employees get the skills development they need. According to APQC's research, AI accounts for a 30% change in learning budgets at the median.

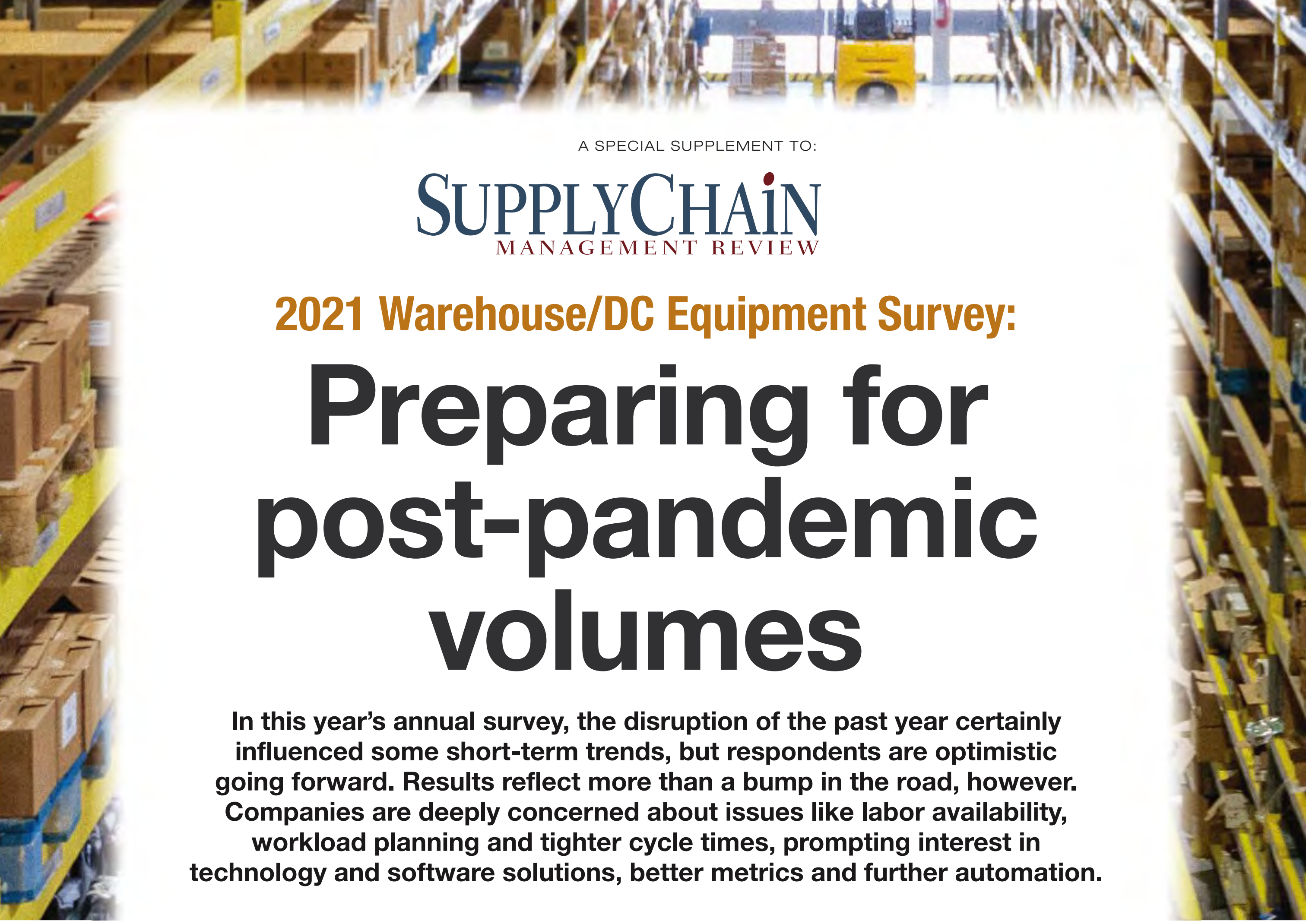
Looking forward

The impact of AI on the supply chain will only continue to increase in coming years. With 40% of organizations currently considering or evaluating the use of AI for supply chain, there is a good chance that a company will be adopting it soon if it has not done so already. The key to retaining employees who will thrive in future supply chain roles is to ensure that they have the right mix of skills to support this technology and leverage it strategically.

Many organizations have already committed to providing learning opportunities for supply chain professionals to develop or enhance critical skills. Although AI does not deliver the reduction in headcount some companies believed would come with it, retraining prevents skills shortages and is a smarter investment than trying to hire new individuals with the necessary skills. APQC encourages organizations to consider employee learning as part of the business case for investing in AI.

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.



A SPECIAL SUPPLEMENT TO:

SUPPLYCHAIN MANAGEMENT REVIEW

2021 Warehouse/DC Equipment Survey:

Preparing for post-pandemic volumes

In this year's annual survey, the disruption of the past year certainly influenced some short-term trends, but respondents are optimistic going forward. Results reflect more than a bump in the road, however. Companies are deeply concerned about issues like labor availability, workload planning and tighter cycle times, prompting interest in technology and software solutions, better metrics and further automation.

BY **ROBERTO MICHEL**, EDITOR AT LARGE

Our "2021 Warehouse and Distribution Center (DC) Equipment Survey" reflects the challenging times that many DC operations face in early 2021: They know they need to invest in more equipment and technology to fulfill more orders efficiently without adding hard-to-find labor, but many are coming off a highly disruptive year of dealing with COVID-19 challenges.

For the short term at least, there's more hesitancy on moving forward with investments than this time last year. This year's survey, conducted in January 2021, is the first annual equipment outlook survey that we've conducted since the pandemic spread globally—a reality that affected many industries negatively, but lead to demand spikes in others.

Perhaps not surprisingly, one of the results of this timing is that the percentage of respondents saying they're currently "holding off" on DC equipment and systems investments given the state of the economy grew from only 8% in early 2020 to 19% this year. The percentage of those saying they're proceeding with investments also took a hit—dropping by 10%.

However, the survey also shows optimism around a fairly rapid return to increased spending on materials handling

2021 respondent demographics

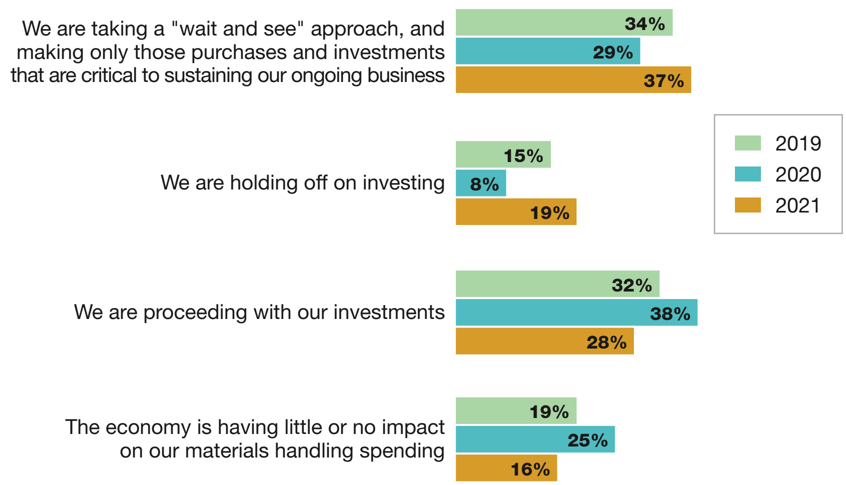
Peerless Research Group's (PRG) e-mail survey questionnaire was sent to readers of sister magazines *Logistics Management* and *Modern Materials Handling* in January 2021, yielding 129 qualified respondents. The respondents were from sites whose primary activity is corporate headquarters (37%), manufacturing (29%), warehouse/distribution (22%), and warehousing supporting manufacturing (3%). The median annual revenue of responding companies is $50 million, while the average is $189 million, compared with an average of $268 million last year, and a median of $58 million. Qualified respondents—managers and personnel involved in the purchase decision process for materials handling solutions—hold influence over an average of 111,250 square feet of DC space.

equipment and systems. Another top finding of this year's survey was the increased interest in spending on information technology (IT) systems and software, including labor management system (LMS) software.

In answers to multiple questions, respondents expressed concerns about labor availability and issues such as workload planning. Respondents are also placing a strong emphasis on doing more over the next two years to automate the gathering of data needed for metrics such as throughput, inventory accuracy and order fulfillment costs.

In short, this latest survey reflects a highly challenging past year with some lingering near-term uncertainty. However, the findings also show that DC operators realize that without continued investment in DC systems and equipment over the next year or two, keeping up with fulfillment expectations, while also coping with ongoing labor scarcity, will be next to impossible.

How is the present state of the economy impacting your spending on materials handling equipment technologies services and solutions?



Source: Peerless Research Group (PRG)

Don't get caught short

According to Norm Saenz, managing director and partner with St. Onge, a supply chain engineering and consulting company and our research partner, companies don't want to be caught on the back foot again with outdated systems and labor-intensive methods. Companies feel the pressure around e-commerce fulfillment, and know that steps need to be taken—even if they aren't a mega-DC.

"Everyone feels the challenges around labor availability, and the pressure to be more competitive with the Amazons of the world," says Saenz. "I think they also realize that technologies are getting better and more affordable, and many of these investments will help them be more productive with fewer people."

Donald Derewecki, a senior consultant with St. Onge, concurs that companies with DC operations are considering ways to automate, as well as ways to make people more productive via investments in areas like better metrics, and other types of IT and software spending.

"The thing about investing in information technology is that it's not necessarily tied to a major automation project or materials handling equipment technology," says Derewecki. "It's possible to get some significant improvements in existing operations without implementing a high level of automation, and spending a huge amount of capital."

Optimism going forward

Every year, the survey asks how the present state of the economy is affecting spending on materials handling equipment and related technologies. This being the first "post pandemic" equipment survey, it's not surprising to see some significant changes on spending trends.

This year, 19% said they're "holding off" on investing, up from only 8% last year.

Additionally, this year, 28% said they're proceeding with investments, which is 10% lower than last year. Those taking a "wait and see" approach also climbed to 37% from 29% last year, and those saying the current economy is having "little or no impact" shrunk from 25% last year to 16% this year.

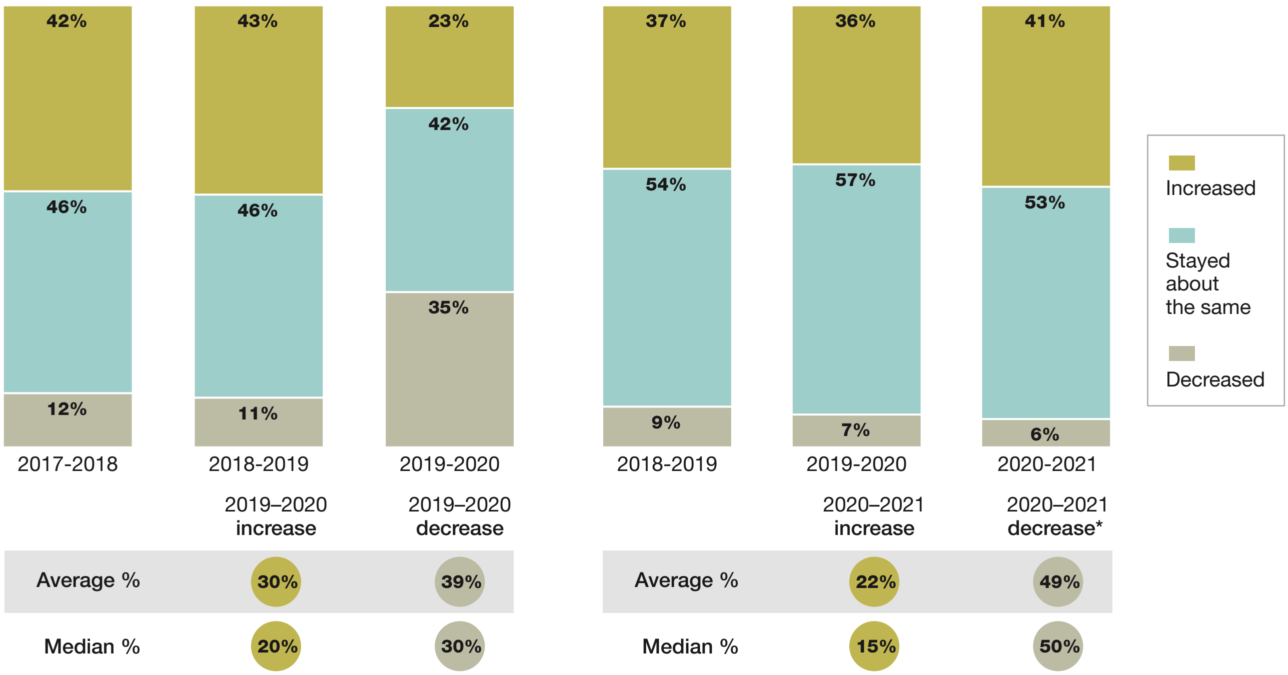
In terms of how spending on materials handling in 2020 compared with 2019, 35% said their spending decreased, compared to only 11% on this question last year (2019 compared with 2018). While there were 23% who said their spending increased during 2020, that compares to 43% the previous year.

These findings indicate that pandemic-challenged 2020 did likely act to curb some DC spending trends—and also likely contributed to some lingering caution. However, the 2021 survey also showed optimism around increased spending on DC equipment and systems going forward.

When asked how present year spending will compare to the previous year, 41% foresee increased spending,

How did your company's spending on materials handling solutions in 2020 compare with 2019? And, by what percentage?

How do you expect your company's spending on materials handling solutions in 2021 to compare with 2020? And, by what percentage?



* 2021 results are based on a small number of cases; data are unstable and any projections based on this information may be unreliable. Figures should be used with caution.

Source: Peerless Research Group (PRG)

up from 36% on this question last year.

Additionally, when asked how spending will change in the next two years to three years, the respondents were fairly bullish. This year, 53% said they expect an increase over the next two years to three years, up from 48% on this question last year, and equal to 2019's answer as to their long-term spending outlook.

Every year brings a new respondent pool, so findings around respondent budgets for materials handling solutions fluctuate. This year, 20% have pre-approved annual budgets of $1 million or more, and another 20% had budgets of between $250,000 to $999,999. However, a combined 46% this year have budgets of $99,999 or less, which contributed to an average pre-approved budget of $369,000.

Average anticipated spending over the next 12 months is $306,990, down from $355,175 last year. Median anticipated spending over the next 12 months is $85,552, down from $97,905 last year.

When asked about areas of investment over the next 12 months across broad categories such as new equipment, IT and software, maintenance, staffing, and third-party logistics (3PL) services, the categories on the upswing were IT, cited by 52% this year, compared to 43% last year. Additionally, 53% foresee the need to add staff this year, up from 40% last year.

"Prioritizing information technology investments is consistent with what we see among our clients," says Derewecki. "Investment in technology and software can help you with issues like maximizing productivity, and in establishing good data and metrics."

Saenz and Derewecki add that among their clients, the mood is quite optimistic, with many moving forward with projects, and most every client assessing how automation and software can help them cope with pressures around rapid order fulfillment without having to bump up staffing levels. "Among our clients, everyone at least wants to consider the automation that is out there," says Saenz. "They're itching to see what makes sense for them."

6 RIVER SYSTEMS

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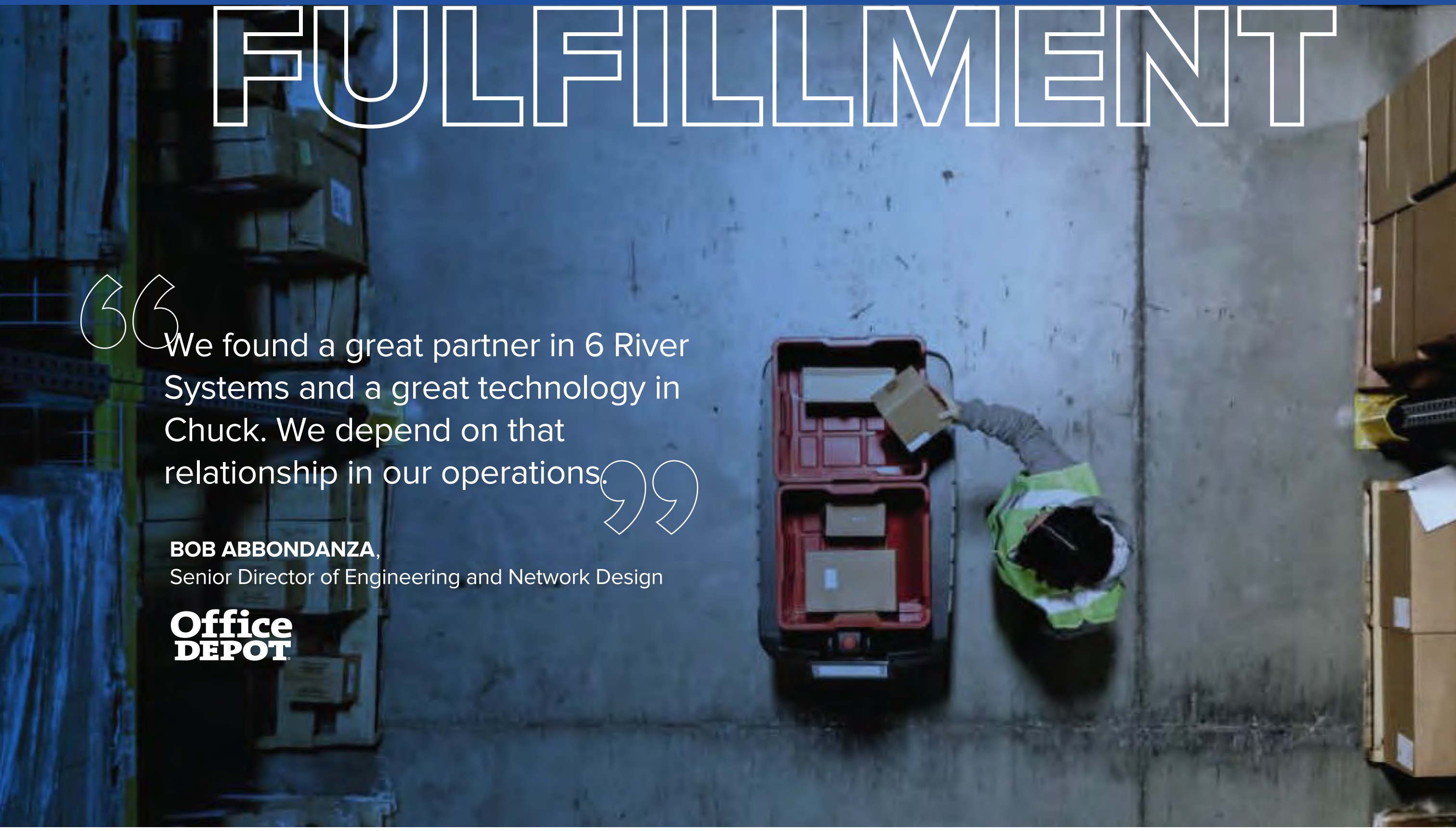

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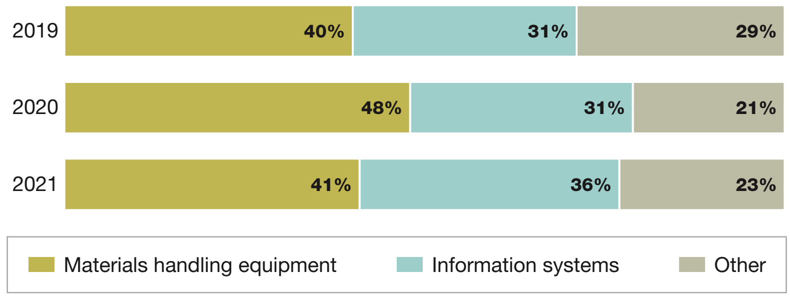
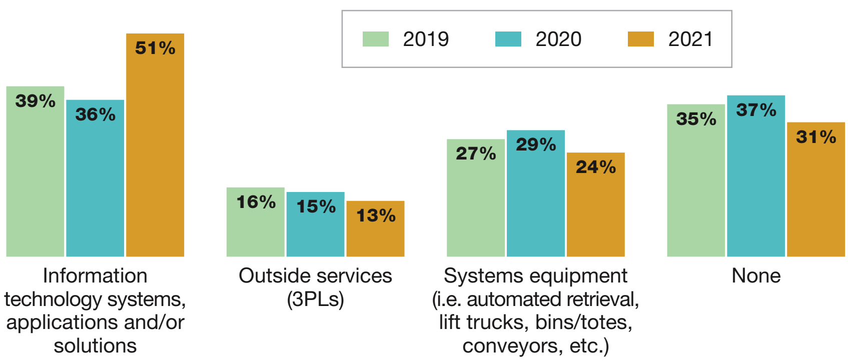
What percent of your overall spending during the next 12 months will be on…



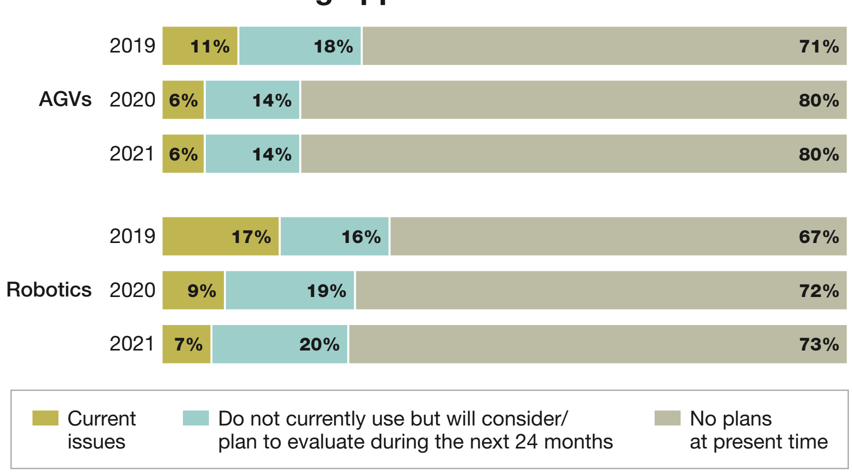
Source: Peerless Research Group (PRG)

Thinking about any new purchases, in which of the following areas were any the first deployment of a new solution, or a substantial change in processes or historical practices?



Source: Peerless Research Group (PRG)

Does your company currently use, or are you considering automatic guided vehicles and/or robotics technologies for materials handling applications?



Source: Peerless Research Group (PRG)

IT as a priority

Interest in increased investment in software and IT solutions is seen in multiple results from this year's survey. When asked what percentage of overall spending will be on either materials handling equipment, information systems (IS), or "other," over the next 12 months, 41% is for equipment, 36% on IS, and 23% on other. Last year, this breakdown was 48% on equipment, 31% on IS, and 21% on other.

When asked to break down which IS subcategories they will be spending on during the next 12 months, categories on the upswing this year include bar coding and data capture (up 9% from 2020); warehouse control system (up 10%); LMS (up by 9%); and voice-directed work solutions (up by 6%). Warehouse management system (WMS) and warehouse execution system (WES) software also increased slightly.

In terms of interest in various types of materials handling equipment over the next 12 months, several categories declined slightly from last year's findings or held steady, but a few saw growth compared to last year. Those on the upswing include rack and shelving (up 10% versus last year); dock equipment (up 6%); order picking and fulfillment systems (up 3%); mezzanines (up 7%); and totes, bins and containers (up 8%).

While the survey didn't ask why these were on the upswing, some facilities may be shifting to narrow aisle layouts to create greater storage density or accommodate extra space for social distancing in value-added services areas, which bodes well for interest in racks and shelving. The surge in e-commerce fulfillment work in DCs can also be seen as increasing the need for mezzanines, as well as totes and bins.

The survey also asked about which new purchases or substantial changes to existing systems fell into one of three broad areas of investment: IT; use of 3PLs; and various "system equipment" such as automated retrieval, lift truck and conveyors. The big gainer here was IT, going from a 36% response last year, to 51% this year.

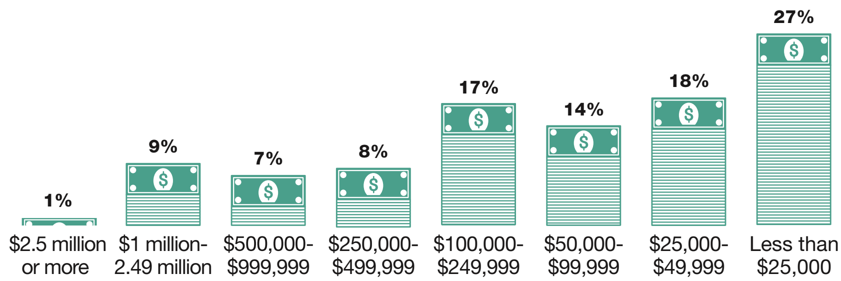
While there was a slight decline for 3PL engagements under this question, a separate question asking about investment areas over the next 12 months, found a 5% rise in those indicating they will use outside services (3PLs) over the coming year.

"Part of that forward-looking interest in using 3PLs may be tied to the recognition by many companies that they need to find a way to bring distribution closer to customers," says Derewecki. "Using 3PLs allows you to accomplish that virtually immediately."

Another finding in the survey that ties into the healthy interest in IT and software is the strong level of respondent interest in having automated processes for gathering and using metrics. This question asked if they use a manual process for certain metrics, an automated one, or are they currently not monitoring the metric area, as well as what they anticipate that process to be in two years.

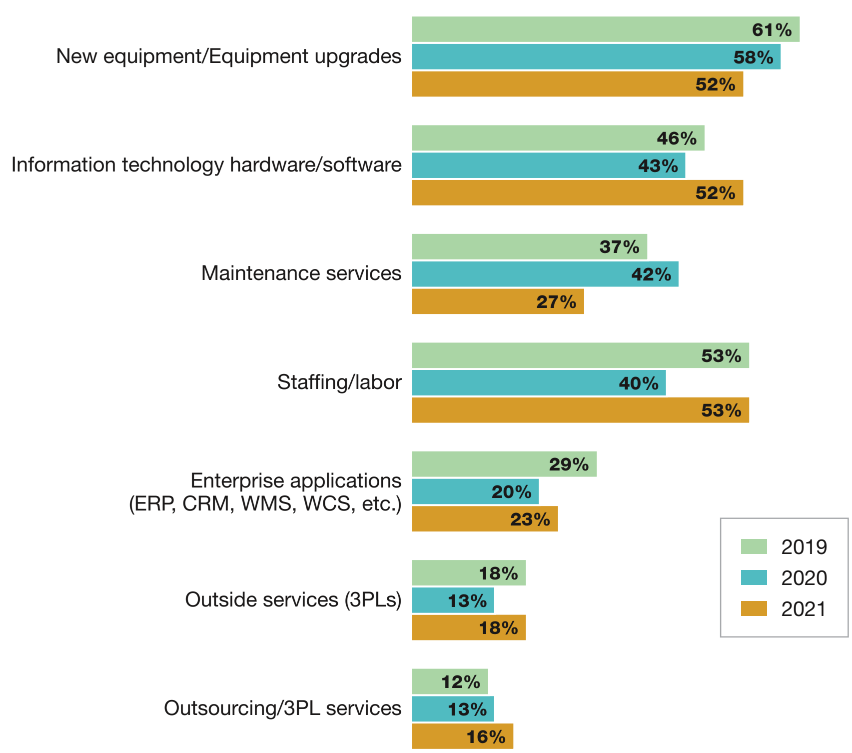
For example, today, daily throughput is monitored via automated methods by 44%, but 69% want gathering of this metric to be automated in two years. Likewise, order fulfillment costs are automated by 35% now, but in two years, 58% want this metric automated.

In total, over the next 12 months, approximately how much do you expect to spend on materials handling equipment and information systems solutions?



	2019	2020	2021
Average anticipated spending	$400,000	$355,175	$306,990
Median anticipated spending	$82,435	$97,905	$85,552

In which areas will you be investing over the next 12 months?

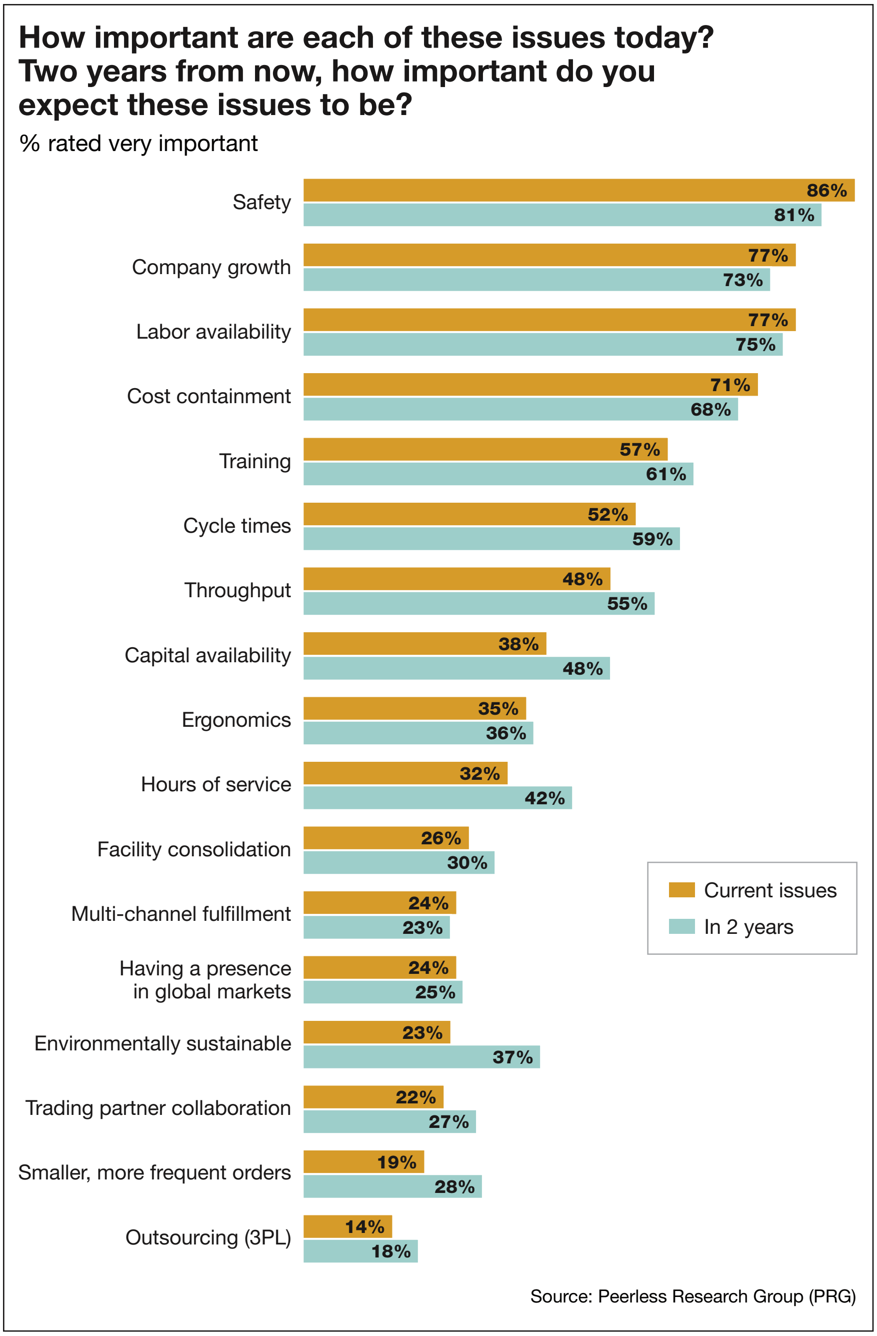


Source: Peerless Research Group (PRG)

Robots level out

Current use and anticipated interest in robotics held fairly steady, which could be considered a victory for the category given the smaller size of many companies in the response base, as well as the unusual pandemic conditions of 2020 including tighter controls on outside visitors as a health precaution.

Current reported use of robotics was at 7% this year, down 2% from last year's response, though 20% this year are considering or evaluating robotics for materials handling applications—1% higher than those answering that way last year. Use of automated guided vehicles (AGVs) held steady, with 6% currently using and 14% considering/evaluating, which are the same



percentages as in 2020.

The survey also asked about applications for robotics that respondents are using or considering. In fact, these are becoming a bit more diverse, though picking remains a top use case. For 2021, pick and place was the top use case for robotics (54%) followed by "order fulfillment, part to picker" and "order fulfillment, picker to part," as well as palletizing. All three come in at 38%. The palletizing role, however, has remained fairly steady in recent years, whereas use and interest in using robotics for picking has grown more in recent years.

The survey also asked about AGV use and applications. This year, higher growth uses include storage, for which 47% are using or considering AGVs, compared to 33% last year, and bin picking, which rose from 11% last year to 32% this year.

Apart from the survey, the use of robotics by many larger DC operators and 3PLs is growing and even becoming more mainstream. For this respondent mix, interest in robotics and AGVs is at least holding steady. What's more, it may be that the market is entering a stage in which robotics and AGVs are no longer novelties, but rather another set of options to be used in combination with fixed automation—or with each other.

"Some of these applications for robotics, like palletizing, have been around for a long-time, and AGVs have also been around a very long time, so in that sense, robotics and AGVs are nothing new, but there is a trend toward wanting greater flexibility in automated transport," explains Derewecki. "There is definitely strong interest in the market in both of these categories as a way of automating various workflows. Some of our clients are also combining AMRs and AGVs with other technologies to create highly automated material flows."

When it comes to mobile technologies, there weren't any big shifts compared to last year's findings, with 53% either using or having plans for mobile solutions, down 2% from last year. This year, 38% said they're providing more employees with mobile solutions, up from 31% last year.

We also ask about current use and 12-month plans for specific types of mobile devices and bar code scanning and printing equipment. Bar code scanners, for example, are utilized by 55% today, and 40% have plans to deploy scanners during the next 12 months. Similarly, voice-directed technology is used by 28%, and 22% have voice system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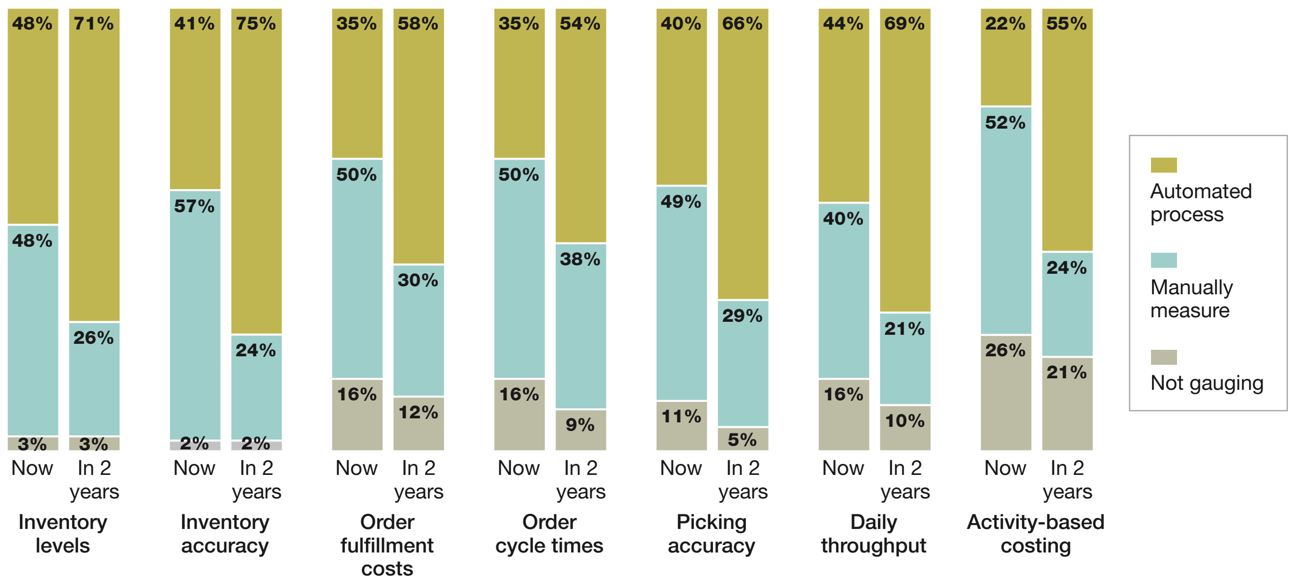
What method does your organization use to gauge or evaluate productivity in each of the following areas?

In two years, how do you anticipate you will be gauging or evaluating productivity in each of the following?



Source: Peerless Research Group (PRG)

plans during the next 12 months.

Generally, rugged bar code scanning equipment and other devices can run adequately for years in a DC before needing replacement. As Saenz sees it, it's an area which is often overlooked and not invested in often enough, given the importance of data capture processes to feeding warehouse management and execution functions, as well as other areas such as labor performance metrics.

"It's an area that needs more attention, because you can't do much without good data and information to inform your facility design and daily operations," says Saenz.

Another equipment concern the survey looks at annually is what role staff, vendors or other parties play in maintaining automated materials handling systems. This year, 53% said they use internal staff for maintenance, down 1% from last year's 54%. Thirty-five percent use a combination of internal staff and some outsourcing, up 3% from last year, and 11% completely outsource it, down from 18% last year. The pandemic conditions may explain part of that decline in full outsourcing of maintenance.

E-comm effects

The survey asked about the most common method of fulfilling online orders today, and which method respondents believe will be most common in two years. The most common practice today is "buy online, ship to customer from a DC," used by 44% today, and expected to be used by 47% in two years.

Other methods expected to be more commonly used in two years include "buy online, ship to customer from store," now used by 5%, but growing to 8% in two years, and "buy online, ship to customer from supplier," now utilized by 5%, but doubling to 10% in two years. "Buy-online, pick up in store," or BOPIS, is also expected to grow in two years, but only by 2%.

The survey also asked if e-commerce activity will or is already prompting change in where distribution and manufacturing activities take place. This year, 47% said e-commerce is prompting more distribution functions in manufacturing, up slightly from 46% last year. The steeper change was in terms of more manufacturing in DCs, which 47% said is happening or has happened, up 11% from last year's 36%.

When asked "where does your packaging and fulfillment occur," the most common type of location is a warehouse, used by 47% of respondents this year, down from 49% last year. The second most common place is a manufacturing location, cited by 40% this year, up from 32% last year. Additionally, 19% said packaging and fulfillment take place at a "fulfillment center," compared to 20% last year, while 30% said these processes take place in a DC, up from 17% last year. Finally, only 2% said these processes occur in retail stores, down from 9% last year.

Pressures associated with e-commerce fulfillment, such as labor availability and tighter cycle times, are reflected in the survey. When asked about the most important issues affecting DCs today as well as two years from now, traditional concerns such as safety, growth, and cost containment still head up the list. But in terms of what rates as "very important" two years from now, some other issues are growing more rapidly.

For example, "cycle time" pressures are rated as important by 52% today, but seen as very important by 59% two years from now. Likewise, "smaller, more frequent orders" gets a 9% bump up in importance two years from now, while "throughput" is up 7%, "capital availability" jumps by 10%, and "environmental sustainability" gains 14%.

A separate question asks respondents to rate the importance of various DC practices like continuous improvement, labor productivity measurement, and workload planning, today as well as two years out. Here too there are areas seen as growing sharply in importance, such as workload planning, rated as "highly important" by 53% today, but by 66% of respondents two years out. Likewise, labor management sees a 7% rise, concerns over same-day shipping grows by 7%, reverse logistics gains 7% in two years, and outsourcing to 3PLs grows 12%.

Many of these areas seen as growing in importance in two years involve labor, and being able to flex the distribution operation to keep up with the pace of fulfillment. At least respondents see the storm clouds looming, notes Saenz.

"I think people realize that there will be more economic rebound going forward, and that volumes will go up, but challenges like labor availability and e-commerce pressures will persist and could become even more problematic if another major disruption occurs," says Saenz. "That's why people are looking at how to use more automation, and have better supply chain visibility and better metrics. They don't want to be caught in the same situation again, with over reliance on manual processes. Most operations managers I know want to automate more so that they can handle more volume with fewer people."

Future-proofing

This annual survey also asks about supply chain risk, and oddly, only 39% said they have a plan for identifying and reducing risks, which is down from 52% last year. When those with a program were asked "for which areas," one growing concern in 2021 was "in-house production or operations," up to 76% this year from 60% last year. Other risk areas that gained in response level include supplier risks (up 5%) and data breaches (up 9%).

The survey's finding on capacity levels in DCs and manufacturing sites stayed relatively steady. However, for stand-alone DCs, a combined 31% of respondents said that their current capacity level was at 81% or higher, indicating that these operations are in a space crunch and need to find ways to add more capacity.

Overall, the survey points to an industry coming out of a highly disruptive era, but it also one that's well aware of the need to layer in further automation to keep up with the unrelenting growth of e-commerce and lessen the reliance on labor. Not only are such investments needed for operational effectiveness, notes Derewecki, a company's ability to excel at on-time, accurate order fulfillment is essential to customer perceptions of quality and trust.

Automating more can help ensure reliable, fast order fulfillment, but so can smaller investments in software or applications that deliver insights to managers on key metrics such as on-time shipping, or "dock-to-stock" cycle times. In fact, while only 25% automate the gathering of dock-to-stock cycle time data today, in two years, 55% want to handle this metric in an automated way.

"One of the factors that's going to motivate more companies to improve on both their information systems, and their equipment and automation, is the perceived quality of their product or service level," says Derewecki. "If someone is happy with a service or product you provide, that person might not tell anyone, but the moment a customer is unhappy, everyone is going to hear about it. No one in business can ignore quality, so in addition to needing more automation to contain costs and deal with labor scarcity, the other big driver is ensuring high quality."

Saenz agrees that it's clear the market is looking at using more automation and software, or for some operations, more basic improvements in areas like new racking and conveyor. Not only do operations managers want to avoid being stuck with over-reliance on manual processes when the next major disruption occurs, he explains, "even without another big disruption, they know they can be more effective with more technology and automation."

Roberto Michel is an editor at large for Supply Chain Management Review

A SPECIAL SUPPLEMENT TO:
SUPPLYCHAIN MANAGEMENT REVIEW

3PLs take to a rapid clip

The global pandemic has presented unprecedented challenges. Yet, third-party logistics operators have demonstrated resiliency and strength.

BY **KAREN E. THUERMER**, EDITOR AT LARGE

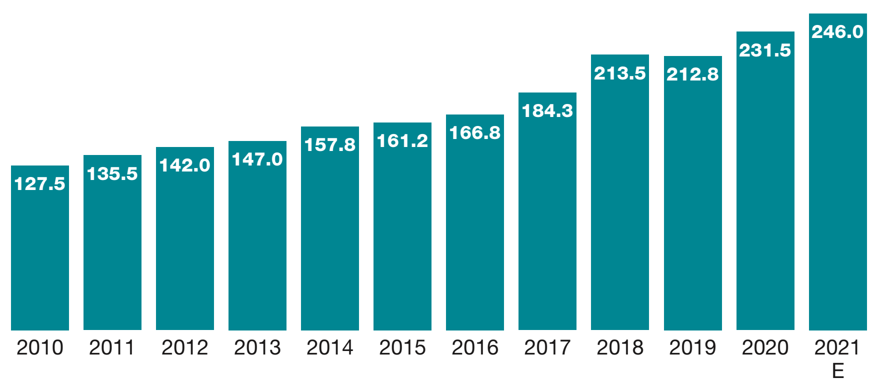
Armstrong & Associates (A&A) reports that the third-party logistics (3PL) providers industry will realize an estimated $246 billion in gross revenues in 2021, up 6.3% compared to $231.5 billion in 2020. The 2020 revenues were up 8.8% over 2019.

"Most of that growth in 2020 came from international and domestic transportation management, which responded to COVID-related demands for PPE and to restock inventories upon economic reopenings," reports Evan Armstrong, A&A president.

While revenue rankings changed little for the top U.S. 3PLs in 2020 compared to 2019, J.B. Hunt did move from a No. 4 position to No. 5 and was replaced by Expeditors, which moved up from No. 5 to No. 4. DHL Supply Chain & Global Forwarding and Kuehne + Nagel retained the top two positions for in A&A's 2020 Top 50 Global 3PLs. DB Schenker moved

U.S. 3PL market

(Gross revenue/turnover, U.S. $ billions)



Source: Armstrong & Associates

from a No. 4 ranking in 2019 to No. 3, and Nippon Express slipped from No. 3 in 2019 to No. 4. (See charts.)

3PLs fared better overall in 2020 than in 2019, which registered the industry's first decline since 2009, but A&A reports that segment growth was uneven.

"Total 3PL segment net revenues [gross revenues less purchased transportation] grew 2.1% to $93.5 billion, reflecting gross margin compression due to a volatile carrier sourcing market and transportation management 3PLs spending more to secure hard-to-find carrier capacity," Armstrong says. "The overall gross margin for all segments declined from 44% to 41%."

Numerous factors continue to have an impact on the 3PL industry, most notably consolidation, e-commerce, and digitalization as well as the need to be resilient and responsive. Following is a look at each.

Consolidation

While the pandemic made for limited merger and acquisition activity, Nick Bailey, head of research for Transport Intelligence Ltd., observes that early 2021 indicates the appetite for 3PL M&A sector is as healthy as ever.

"We've seen big moves from Kuehne + Nagel (K+N), SF Express and most recently DSV Panalpina with its acquisition of Agility's Global Integrated Logistics operations," Bailey says. "Each added scale and established or deepened geographic coverage and service offerings."

Bailey attributes this to changes in

Armstrong & Associates Top 50 U.S. 3PLs

(as of April 9, 2021)

2020 Rank	Third-party Logistics Provider (3PL)	2020 Gross Logistics Revenue (USD Millions)*
1	C.H. Robinson	15,490
2	XPO Logistics	12,107
3	UPS Supply Chain Solutions	11,048
4	Expeditors	10,116
5	J.B. Hunt (JBI, DCS & ICS)	9,198
6	Kuehne + Nagel (Americas)	6,789
7	DHL Supply Chain (North America)	4,415
8	Coyote Logistics	4,280
9	Transportation Insight	4,270
10	Total Quality Logistics	4,138
11	Burris Logistics	4,100
12	DSV Panalpina (Americas)	4,020
13	Ryder Supply Chain Solutions	3,774
14	Hub Group	3,646
15	Transplace	3,400
16	Penske Logistics	3,200
17	Schneider Logistics & Dedicated	2,814
18	NFI	2,631
19	DB Schenker (North America)	2,627
20	GEODIS (North America)	2,543
21	Echo Global Logistics	2,512
22	Ingram Micro Commerce & Lifecycle Services	2,300
23	Landstar	2,196
24	FedEx Logistics	2,100
24	MODE Transportation	2,100
25	CEVA Logistics (Americas)	2,000
26	Americold	1,983
27	GlobalTranz Enterprises	1,651
28	Worldwide Express/Unishippers	1,650
29	Lineage Logistics	1,645
30	BDP International	1,552
31	Werner Enterprises Dedicated & Logistics	1,527
32	Knight-Swift Transportation	1,430
33	TransGroup Global Logistics	1,300
33	Maersk Logistics (Americas)	1,300
34	Ruan	1,223
35	AIT Worldwide Logistics	1,220
36	syncreon	1,203
37	Radial	1,200
38	Universal Logistics Holdings	1,190
39	Nolan Transportation Group	1,172
40	Kerry Logistics (Americas)	1,115
41	Capstone Logistics	1,040
42	Odyssey Logistics & Technology	1,018
43	Uber Freight	1,011
44	APL Logistics (Americas)	1,010
45	Ascent Global Logistics	974
46	Crane Worldwide Logistics	916
47	OIA Global	876
48	Pilot Freight Services	874

*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.


IF FOOD DOESN'T SPOIL, NOBODY EATS THE COST.
Delays not only hurt your reputation, they also damage your bottom line. It's why we're dedicated to getting perishable products to market quickly and efficiently. All so you can keep your promises and your profits. It's how we deliver confidence. Learn more at gopenske.com.
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global trade patterns, including China's impact on global supply chains, digitalization, the rapid development of technologies that increase the strategic value of supply chain operations to shippers, and the fallout of the COVID-19 pandemic. "3PLs are looking to M&A to increase competence and market share," he says.

Affecting these factors are sky-high freight rates, which are expected to remain throughout most of 2021, and available capital to fund deals.

Bailey suggests that as 3PLs looks to add geographic coverage and complementary services, shippers may find a shifting landscape of services and potentially increased price competition as 3PLs compete for share on key trade lanes.

"Large 3PLs will also look to M&As to kickstart their digital forwarding offer," Bailey adds. Case in point: Bollore's acquisition of Ovrsea.

Mid-sized 3PLs may not be able to compete on scale or provide the technology shippers' demand, he warns.

E-commerce

McKinsey & Co. hit the nail on the head when it said e-commerce moved 10 years ahead in just 90 days. According to the consulting firm, e-commerce jumped 15% to 35% during the U.S. lockdown in Q1 2020. E-commerce continues to be the fastest growing domestic 3PL segment, with a compound annual growth rate of 28% since 2017, states A&A.

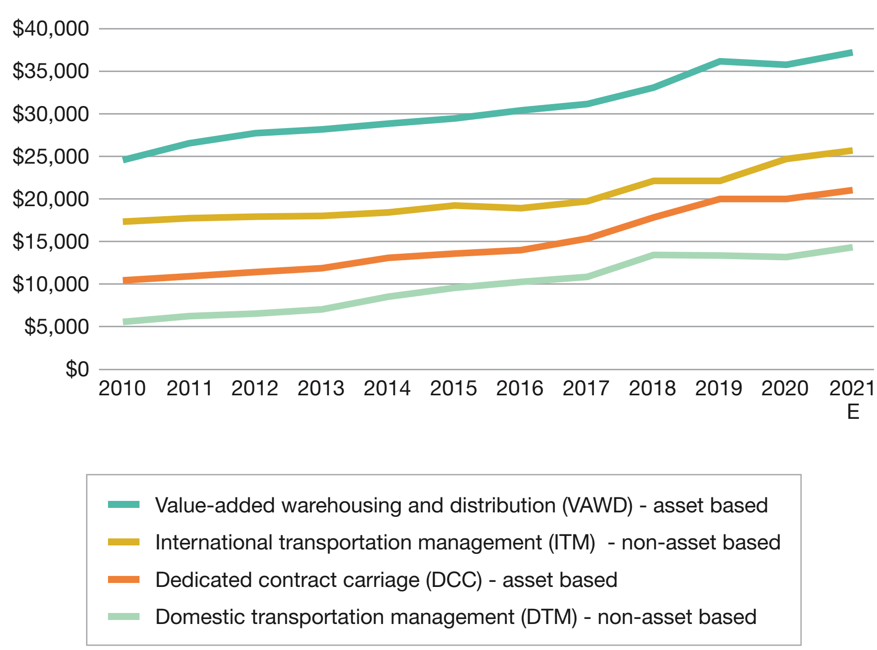
Cathy Morrow Roberson, president of consulting firm Logistics Trends and Insight, emphasizes: "Today, everything coming into a warehouse needs to be processed

Growth by U.S. 3PL market segment

	2020 Gross revenue (U.S. $ billions)	2020 Net revenue (U.S. $ billions)	2020 vs. 2019 Net revenue (YoY growth rate)	1995-2020 Net revenue CAGR
Value-added warehousing and distribution	47.2	35.7	-1.1%	10.2%
International transportation management	58.7	24.6	11.4%	10.8%
Dedicated contract carriage	20.7	20.0	0.3%	7.3%
Domestic transportation management	83.0	13.2	-1.8%	10.5%
TOTAL	209.3	93.5	2.1%	9.6%

3PL segment net revenues

(U.S. $ millions)



Source: Armstrong & Associates

Armstrong & Associates Top 50 Global 3PLs

(as of April 19, 2021)

2020 Rank	Third-party Logistics Provider (3PL)	2020 Gross Logistics Revenue (USD Millions)*
1	DHL Supply Chain & Global Forwarding	28,453
2	Kuehne + Nagel	25,787
3	DB Schenker	20,761
4	Nippon Express	19,347
5	DSV Panalpina	18,269
6	C.H. Robinson	15,490
7	XPO Logistics	12,107
8	Sinotrans	11,959
9	UPS Supply Chain Solutions	11,048
10	Expeditors	10,116
11	J.B. Hunt (JBI, DCS & ICS)	9,198
12	GEODIS	9,135
13	CEVA Logistics	7,400
14	Toll Group	7,260
15	CJ Logistics	7,174
16	Maersk Logistics	6,963
17	Kerry Logistics	6,867
18	DACHSER	6,591
19	Hitachi Transport System	6,346
20	GEFCO	5,365
21	Bolloré Logistics	5,265
22	Kintetsu World Express	5,003
23	Coyote Logistics	4,280
24	Transportation Insight	4,270
25	Yusen Logistics	4,248
26	Total Quality Logistics	4,138
27	Burris Logistics	4,100
28	Agility	4,018
29	Ryder Supply Chain Solutions	3,774
30	Hub Group	3,646
31	Transplace	3,400
32	SAIC Anji Logistics**	3,202
33	Penske Logistics	3,200
34	Schneider Logistics & Dedicated	2,814
35	Hellmann Worldwide Logistics	2,740
36	NFI	2,631
37	Echo Global Logistics	2,512
38	Sankyu	2,491
39	Imperial Logistics	2,334
40	Ingram Micro Commerce & Lifecycle Services	2,300
41	Apex Logistics International	2,274
42	Landstar	2,196
43	Mainfreight	2,155
44	FedEx Logistics	2,100
44	MODE Transportation	2,100
45	Groupe CAT	1,990
46	Americold	1,983
47	ID Logistics Group	1,930
48	Fiege Logistik	1,925
49	GlobalTranz Enterprises	1,651

*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. **In-house logistics operations were capped at 50% for fairness.

and fulfilled fast." She attributes this to the "Amazon effect" whereby consumers now expect same-day rather than two-day deliveries. "3PLs providers are jumping into this. It's no longer a space for UPS or Fedex," she says. "3PLs need to link every part of the supply chain."

Just as shipments must move fast, so must 3PLs in order to adjust their business models if they want to compete. Roberson notes that some 3PLs, such as SEKO, are building and partnering with startup tech companies that offer Cloud technology to help not only fulfill orders quickly, but create last-mile options around urban areas. "It's an investment that has become a requirement," she says.

3PLs are particularly re-engineering processes and evaluating automation to increase productivity. "They are procuring software, such as distributive order management, that allows them to offer services outside their four walls," reports Bob Thomson, senior director, enVista. "They also continue to focus on reverse logistics and value-added service that helps reduce labor requirements."

Such a shift, Thomson notes, has also created new customers for legacy big box consumer packaged goods (CPG) 3PLs. "They now have to learn, along with their customers, how to fulfill package-size shipments and deliver them efficiently," he says. "Consequently, 3PLs are seeing an increase in service level agreements and smaller order profiles."

A&A observes how value-added warehousing and distribution (VAWD) 3PLs continue to benefit from growth in retail e-commerce business. "Many VAWD 3PLs are supporting retail brands' strategies to manage their own order fulfillment channels and avoid being captive to large e-retailer platforms such as Amazon," Armstrong says.

Operationally, the growth in e-commerce has also meant an expansion in multi-client warehousing/fulfillment operations, many of which have footprints under 100,000 square feet. But an ongoing headwind for VAWD 3PLs, A&A maintains, is the "Amazon effect."

"3PLs are continuing to see increased competition from Fulfillment by Amazon (FBA), which controls 60% of the U.S. e-commerce 3PL market," says Armstrong. The result has been dramatic on warehouse worker wages and lease rates in key distribution locations. These factors are consequently driving significant interest from 3PLs to evaluate the benefits of automation and how it can eliminate mundane tasks and physical job requirements. This includes autonomous robotic solutions.

"With some autonomous robots costing less than $500 per month to operate, the cost/benefit and positive return on investment are increasing 3PLs' interest in warehouse robots to support activities such as picking, put away, and cycle counting," Armstrong says.

Digitalization

The last decade has seen an explosion of data created around logistics operations as sensor technology and Internet connectivity have both become increasingly cheap and ubiquitous. As a result, 3PLs are set to undergo a shift in the short- and medium-term that promotes greater use and sharing of data captured and created.

"Those 3PLs that can most effectively expand the core of their value proposition to include the capturing, contextualization and sharing of logistics and supply chain information will be best placed to navigate the opportunities digitalization offers," says Bailey.

Already, services available through the industry has seen a huge boost thanks to digitization. "The speed at which digitalized services and business models are becoming standard in the industry is changing the relationship between 3PLs and shippers," Bailey adds. "3PLs are increasingly being pushed to provide information alongside the physical movement of goods which empowers shippers to make decisions that improve their own business processes."

Armstrong points out how the ongoing digitalization of transactional truckload domestic transportation management (DTM)/freight brokerage continues at a rapid pace, as more large shippers have built integrations to 3PL's transportation management systems (TMS) for API truckload spot-market rate quoting and automated load tendering and booking.

In turn, most of the top freight brokers are strategically looking at ways to digitalize operations while adding value through improved carrier management, and customer and carrier experiences.

"About 20 3PLs have built TMS interfaces that provide these shippers instant rate quotes and the ability to complete load tendering and booking through the system APIs," says Armstrong. "This process automates traditional spot-market freight brokerage sales functions and is increasing shipper's use of more spot versus contract pricing."

Armstrong notes how increasingly important it is for shippers to build APIs with their top transportation management 3PLs to reduce tendering friction and more efficiently secure spot-market truckload capacity. "Getter closer to 3PLs via technology is one way to better manage your supply chain and keep enough carrier capacity available to meet demand," he says.

In addition, sales automation for spot-market truckload automation is happening in conjunction with the automation of carrier sales functions within freight brokers using intelligent capacity management systems to digitally match shippers' loads to carriers based on historical and real-time carrier capacity data analyzed via machine learning/artificial intelligence algorithms.

"This digital freight matching [DFM] capability has become a competitive differentiator within the DTM segment, as DTM 3PLs look to increase the number of shipments they manage per person per day," Armstrong says. "Ultimately, this automation will put further pressure on freight brokerage gross margins, while it should improve overall profitability."

Takeaways

Given the rapid changes occurring within the 3PL industry, providers are increasingly called upon to address such topics as network analysis, inventory optimization, and packing design. In addition, they can provide network solutions to warehousing to cover most of the domestic market within two-day delivery.

"The additional benefit we see now is spreading the demand to help with capacity issues as well as having an additional node if the one DC goes down due to the pandemic," Thomson says.

3PLs are also having to offer new delivery service types. Particularly attractive for 3PLs that also operate warehouses is the ability to offer final-mile capacity. "They're also responding to freight capacity more proactively to utilize spot markets," Thomson says.

Going forward industry experts expect more M&A activity within the 3PL industry. Digitalization and automation will only increase as the industry becomes more competitive. Sourcing will become even more critical as manufacturers work to replenish the low inventories that resulted during the pandemic. China is expected to be a factor impacting 3PLs as shippers and manufacturers increasingly consider locations in which goods can be sourced and produced.

"As China's role in global value chains evolves and stages of manufacturing spread regionally, and perhaps globally, 3PLs and shippers will potentially face a number of complex challenges around the timing and sequencing of production stages that rely more heavily on coordinated supply chain movements over larger geographies," comments Bailey.

Roberson recalls: "A few years ago Fred Smith, CEO of FedEx said on an earnings call, 'gone are the days of traditional peak season. Expect a continuous peak throughout the year. It will be like waves.'"

Karen E. Thuermer is an editor at large for Supply Chain Management Review

EXECUTIVE INSIGHTS

Are you preparing your workforce to be ready for what's next?

Q&A with **Alan Dunn**, Lead, Global Supply Chain Education, Caltech

Q: How do you see the state of the workforce as we emerge from the tremendous shock of the pandemic?

A: The word disarray comes to mind. Supply chains weren't just paused. The pandemic affected people. Lives were turned upside down, and I believe we were given a glimpse into what is truly important. We have to take care of others. Organizations must take care of their employees and partners. Supply chains of all domains—local, global—are stretched, assets are out of place and the orchestration is still primarily run by operators working from home and in the field. The overall effect of that strain is the inability to execute with clarity, capacity, resilience, responsibility and effective decision-making. Personal impact makes all that harder.

Q: What are the most significant opportunities for leaders?

A: Before the pandemic, I would have told you to prepare for a talent shortfall in supply chains. We were at the precipice of losing rich institutional knowledge from a generation of operators who knew

business cycles. The talent crisis has been exacerbated to an extent, and we have four other forces at work to be ready for. In the short term, it's the economic restart and reallocation of resources, such as positioning assets and people or reshoring to mitigate risk. On the mid-term horizon, autonomous systems and analytics adoption is a critical thread to focus on out of digitalization because it requires re-thinking transportation, networks and customer interactions. How organizations must be designed and run will be profound. The central opportunity for leaders and teams is to be curious.

Q. What do you mean curious?

A: Given the myriad challenges, it's natural to feel overwhelmed. Curiosity helps keep you grounded by stripping away the complexity. The art of inquiry has greatly served scientists and leaders alike. That requires understanding context and some savvy. For a given idea or plan, what has to be true? Will different personal perspectives or data change things? Leaders need to build their curiosity muscles. Everyone does, actually.

Q. Can you tell me more?

A: We work with the companies that are on the frontier of technology and engineering. They have complex, global supply chains and incredibly diverse talent. Through personal coaching, workshops and tailored learning experiences, we help their teams learn the art of inquiry and curiosity, applying practical skills in real-world projects, and prepare them to be adaptive for new challenges to come. When we cascade that throughout an organization, there is nothing their talent can't achieve. Think of it as building better innovators.

EXECUTIVE INSIGHTS

Get back in the swing of regulatory compliance

Q&A with **Scott C. Dunsmore**, CIT, Vice President of Training & Business Development, Lion Technology

Q. As facilities return to full strength, what should regulatory compliance professionals do to ensure a smooth transition back to normal operations?

A: Make sure your compliance knowledge and procedures are all up to date with the latest regulations. It may have felt like the world stood still for the past year, but regulatory activity continued throughout the public health crisis.

Set aside some time for training to get yourself up to speed or just refresh your expertise. If you ship hazardous materials, the transportation regulations for your shipments may have changed. The ORM-D designation for hazmat consumer commodities officially phased-out of ground transportation as of January 1 and new editions of international air shipping standards are in effect for 2021. Your state may have adopted new hazardous waste regulations.

Before you settle into old habits, make sure you know how recent regulatory changes will affect what you do.

Q: What kind of training should managers consider for new hires or employees returning to work?

A: It depends on the facility and each employee's responsibilities. If you ship hazardous materials, US DOT requires training for all "hazmat employees." If your site generates hazardous waste, US EPA requires training for personnel under its RCRA program.

There are OSHA concerns to consider—Hazard Communication training for employees who work around hazardous chemicals, HAZWOPER for emergency responders and cleanup personnel—the list goes on.

We're all human. We forget things that we don't deal with every day. A refresher to re-familiarize returning employees with their compliance responsibilities may be wise.

Q: Is online training here to stay? Will facilities return to in-person training now that businesses are re-opening?

A: I expect to see a mix of both. Online training provided flexibility for employees to complete training remotely, something that was crucial over this last year. Some found that they prefer the convenience and ease of learning online. Others are excited to get back in the classroom to learn in-person.

Q: How does Lion help meet demand for these different styles of training?

A: Our instructors and subject matter experts worked non-stop this past year to keep our training and reference materials up to date with changing regulations and agency guidance. Lion delivers training in person and online in multiple formats—so there are options to fit any schedule, experience level or learning style.

We are re-launching our in-person workshops this summer, so professionals who prefer classroom learning and networking with their peers can join us live when our instructors hit the road. In-person or online, what's most important is that the training you rely on is up to date and effectively prepares you protect employees and keep your site in compliance.

"Why can't I get wood pallets, and who can help?"

Q&A with **Gary Sharon**, Executive Vice President, Litco International, Inc.

Q: Why are we having a difficult time finding new and used wooden shipping pallets?

A: It simply comes down to supply and demand. Here are two reasons why. First, many sawmills had scaled back production during COVID-19. Now that business has started to rebound, it's not possible for them to meet the rapid increase in demand. Especially with a shortage of willing workers. Second, due to a shortage of lumber, prices have increased sharply. As a result, some pallet makers can't get, or afford, pallet lumber. They are forced to either reduce or stop production. This has created a "perfect storm" which is causing many pallet buyers to scramble for supply.

Q: Is this affecting lead times?

A: Yes. Pallet production lead-times have stretched from two weeks to four weeks in most cases, and as high as seven weeks in some regions. Pallet makers are also reluctant to take on new customers while struggling to service their existing customers. The outcome is that many pallet users are desperate, and willing to buy anything that might work for their applications. They are now looking at alternatives to traditional new and used wooden pallets that they would not have seriously considered in the past.

Q: How long will the shortage last?

A: That's hard to predict. As of this writing, softwood lumber prices are beginning to retract from their peak, but still remain high. Hardwood prices continue on an upward trend. Will it ever get back to like it was? I doubt it! More importantly, we know that it probably won't be until sometime in 2022 before the pallet pipeline is full again.

Q: What can I do now to protect myself from running out of pallets in the future?

A: Now is the time to take a hard look at alternatives to traditional wood shipping pallets that are not as dependent on hardwood and softwood boards. They may work in your application. For example, our Engineered Molded Wood™ pallets represent an alternative to get products safely to market. Litco's pallets are certified sustainable, available and priced less than new solid-wood, and most other pallet alternatives. They are also tested per ASTM D-1185 procedures to be as strong as solid-wood slat and nailed pallets. They are also stiffer, and have a higher impact resistance to lead-edge damage. Because they use wood chips, they are not as subject to the drastic market swings as new, and recycled solid-wood pallets. As a "processed wood" product, they meet the IPPC-ISPM 15 standards for export shipping.

What's next on the logistics horizon?

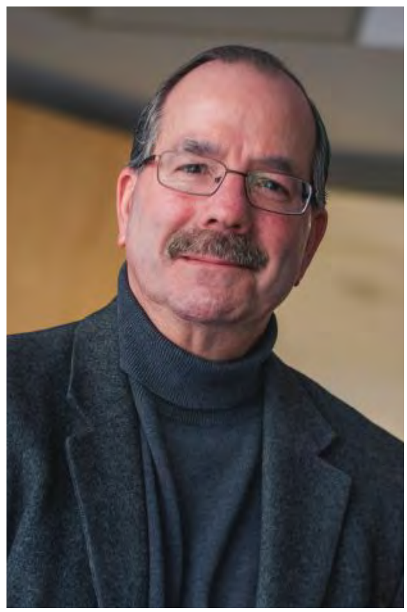
Q&A with **Bob Shellman**, President and CEO, Odyssey Logistics & Technology

Q: What's next on the logistics horizon?

A: As the world shows signs of turning the corner from the global pandemic, we are only beginning to realize the long-term ramifications of the past year. There are several key areas where shippers can focus their time and resources to limit disruption.

Q: How can an organization break through supply chain gridlock?

A: While there is no overnight fix for the myriad supply chain and transportation issues that have surfaced in 2021, transportation providers and other entities are taking steps to help minimize the negative impacts on their own organizations and for their customers. As carriers work to attract more drivers, other groups are working to address other supply chain issues like seaport congestion and a lack of ocean shipping containers for imports and exports. With ongoing congestion at larger ports, inbound freight delays are the norm and costs are spiraling. In turn, intermodal yards have never been more congested and over-the- road (OTR) trucking capacity is constrained. It's important to add



diversity to your supply chain and working with a logistics partner that delivers the flexibility to ship import cargo directly to your customers, or cross dock, consolidate, or de-consolidate it into a wide range of services and locations.

Q: How can data visualization improve performance?

A: When global supply chains were disrupted, the shippers best positioned to weather the storm were those who had actionable, visible data. Organizations with data siloed in disparate locations were at a distinct disadvantage. Utilizing sophisticated BI tools, companies can develop digital models to assess and compare trade-offs of potential changes to a supply chain network. This process empowers an organization going through a network optimization to quickly separate opportunities for measurable improvement from activities that result in no real gains—or even losses. The visualization tools make it easy to select the scenarios, view possible strategies and calculate outcomes.

Q: Do sustainability initiatives affect profitability?

A: Sustainability in the transportation industry is not a new topic. Shippers, 3PLS, carriers and others in the market have been talking about reduced carbon footprints, electric and alternative fuel vehicles and other sustainability topics for decades. At Odyssey, we've always believed that the right strategies can increase economic value for shippers and carriers, while simultaneously allowing everyone involved in the supply chain to become better stewards of our planet. We're helping customers build more efficient supply chains, control costs and build reputations as responsible shippers who are willing to track and report their sustainability progress.