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SUPPLYCHAIN MANAGEMENT REVIEW

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Does AFS know logistics?
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Who drives the supply chain car?

If you were dropped onto this planet and landed at McCormick Place in the heart of Chicago in the middle of March, you would probably conclude that planet Earth had been overrun by robots. Everywhere you turned on the ProMat conference floor, there was a robot lifting something, putting something away, or carrying something to another location.

But, despite a conference hall overrun by technology, the on-the-ground reality is a bit different. Not so long ago, commercial real estate firm Prologis estimated the number of facilities with any type of automation at about 10%. But that is changing—quickly. A recent report from JLL found that one-in-two logistics and industrial occupiers plan to increase their use of automation technologies such as automated storage and retrieval systems by 25% between now and 2030.

"The standard lease term for logistics facilities in the region is generally between three years and five years, which makes it too short to recoup CapEx on many new solutions," says Peter Guevarra, director of research consultancy for Asia Pacific for JLL, in explaining the slow adoption to date. And yet, this year's ProMat looked as though it was a robotic takeover.

"Everything has a place," Ed Romaine, vice president of marketing & business development for Conveyco Technologies, said during his presentation on autonomous mobile robots at ProMat.

But not everyone completely agrees. Thomas Jorgensen, president & CEO of Green Worldwide Shipping, believes that despite the tech advances, people will still drive the supply chain car.

Brian Straight, Editor in Chief
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"While societal advancement is largely tied to technological advancement, the true measure of how great the resulting impact is will be anchored in how we integrate that technology into our existing lives and processes as well as how we as a society and community respond and adapt to a new order," he wrote in a recent Forbes Business Council post. Jorgensen went on. "Even with all of the benefits of automation, people will drive the future of the T&L industry—not technology. While technology will continue to increase efficiencies and cost savings, it's going to be the people wielding this technology who will truly shape the trends in the years to come."

So, while you will continue to see great advancements in technology, remember that the future will not be possible without the people that are driving the future.

Many of those people will be on hand when Peerless Media hosts its NextGen Supply Chain Conference on Oct. 16-18 at the Chicago Athletic Association in Chicago. Featuring top executives highlighting current and coming supply chain technologies and processes, the show is a must attend.

Register at **nextgensupplychainconference.com** or go to **scmr.com** and click the "events" tab. I look forward to seeing you there.

Brian Straight

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100% uptime for renewable energy sources

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My March/April Insights column was titled: "Oil update: We need security plans from policymakers." It represented the latest in a 17-year series chronicling oil pricing starting with my first *SCMR* column, appropriately titled: "Is your supply chain addicted to oil?" While started because oil pricing was expected to rise over the long term, more recent columns have focused on the impact of global initiatives to develop renewable energy sources to replace the lion's share of fossil fuels to drastically reduce CO_2 emissions and prevent the Earth from overheating.

The recent column discussed how global policymakers have been relatively ineffective in using diplomacy to come up with a coordinated plan toward a world free of fossil fuels. The Russian invasion of Ukraine has made most of them realize that an energy plan is not sufficient. The business world needs plans with less uncertainty and more clarity. We can only get that when policymakers finally develop three coordinated and balanced plans for energy security, economic security, and climate security. These are likely to be developed later, rather than sooner.

Recommendations regarding the oil update

The advice to managers has generally stayed the same during the past few years. That is, it will always be prudent to reduce the use of carbon-based energy sources by making your supply chains as energy efficient as possible. However, managers ought to be cautiously on the lookout for serious and harsh Green New Deal initiatives from government policymakers in the future. Given their progress to date, when these policies are established is anybody's guess.

Policymakers are having difficulties weaning people away from fossil fuels. Why? Because these fuels—in solid, liquid, or gaseous form—can be easily transported and stored to where energy is needed. Meanwhile, the biggest issue with renewable energy—wind turbines and solar panels—is that they are intermittent sources of electricity. Electricity only gets created when the wind blows and the sun shines. Not necessarily when and where there is demand for energy. Thus, energy generated by them needs to be 1) sold to an electric grid, 2) stored (e.g., in batteries) or 3) used to make non-fossil fuels (e.g., hydrogen or ammonia). However, developing technologies for battery storage, as well as for production of non-fossil fuels on a large scale, are nascent at best. As well as requiring massive and uncertain innovation.

Renewables require reliability and rapid repairing

The biggest issue (or the elephant in the room) to replacing fossil fuels with energy based on wind turbines and solar panels is their intermittent nature. Renewable innovation has not kept up with a still-growing thirst for fossil fuel energy from a worldwide population that will continue to grow for quite some time. Over these past two decades, the world's population increased from about six billion to a current eight billion, on a possible path to nearly 10 billion by 2050 according to the United Nations, further increasing the need for fossil fuels.

I recently met with an entrepreneur who was working on developing offshore floating wind turbines. He wanted to pick my brain on the supply chains that would be needed to support these turbines. When I asked about electricity storage needed, he said that the electricity generated by the turbines would be immediately used to make ammonia—a non-polluting fuel that can be stored, transported, and used on demand.

My advice to him was that he also had to develop a service-parts supply chain with a goal toward achieving 100% uptime while the wind is blowing. Uptime doesn't matter when it is not. If a turbine malfunctions while the wind is blowing, that would amount to wasted valuable time needed to generate carbon-free electricity. He ought to design the wind turbines and their service-parts supply chain to support a 100% uptime goal. The turbine itself should be designed to be close to 100% reliable—rarely failing. To support this goal, an excellent preventive maintenance program is required.

When a part fails, it ought to be fixed almost immediately That means he has to have an order fill rate of 100% for those service parts that might fail and cause a turbine to become inoperable. Based on my experience, I believe that service parts inventory management is the most complex and difficult of all inventory management business processes. The complexity is due to various characteristics of the parts themselves, such as the following.

- Myriad numbers of parts to store and manage.
- Some parts are extremely inexpensive and some very expensive.
- Some parts are very small (e.g., nuts and bolts) and some very large (e.g., turbine propellers).
- Some parts are needed often, and many needed only sporadically.
- Some parts are critical to the malfunctioning of a product that they are a part of (e.g., a broken turbine propeller).
- Some parts are safe from hostile environments, and others are not (e.g., off-shore turbines in a hurricane).

Learnings from the pandemic

In my November 2022 *SCMR* column, "Respect 'good' inventories," I stated that "good" inventory has a deliberate deployment purpose; while "bad" inventory is often just-in-case. As an aside, just-in-case inventory has a purpose in chaotic business environments when demand is uncertain, and you can only sell what you have. When supply chains broke down during the COVID-19 pandemic, a business could generally sell whatever it had available. In some business environments, fortunate companies did not miss sales of high-margin products. So, what kind of inventory is good for renewable energy sources?

In my September/October 2020 column, "Supply chain heroes and lessons from COVID-19," I discussed that the pandemic exposed the fact the United States was not self-sufficient in personal protection equipment (PPE) supplies needed by medical personal —especially masks. The United States relied on low-cost Asian labor to produce these inexpensive supplies—often of poor quality. When the global pandemic hit, the sourcing countries did not send the United States what it had ordered because they needed it for their own citizens (something the United States would have done if the shoe were on the other foot). The COVID-19 shortage of PPE exposed the fact that the United States wasn't self-sufficient here.

I also suspect that the use of standard Pareto-based A/B/C inventory management practices might have also been complicit in the PPE shortages. These practices put the most inventory focus and resources into A items, less so into B items, and the least into C items. The ranking criteria for items are often predicated on revenue, usage, and inventory value. Pre-pandemic, masks were likely viewed as a C item based on these criteria. During the pandemic, the criteria should have been drastically changed.

Human life as we know it is at stake

During my work in service parts logistics, I learned about another important ranking criterion termed "criticality." It is based on the cost of shortage—to the user, not the supplier. Per the Newsboy Problem, the cost-of-shortage (e.g., lost sales) and the cost of surplus (e.g., excess inventory) determine the optimal supply/inventory ratio to have on hand to meet customer demand. I discussed this in my November 2018 column "e-tailing Update: Lessons from the newsboy."

Criticality uses the costs (e.g., lost revenues) to a customer, not the supplier, when operations are shut down for lack of a part. For example, Caterpillar offers next-day delivery on critical parts because these part failures would shut down construction and mining operations around the world, thereby negatively affecting revenues of the customer. Similarly, in computer services, there are parts whose failure would shut down computerized transactional systems such as airline and hospitality reservations, and banking and other financial operations. Critical parts (by their nature) are A parts irrespective of revenues, usage, or inventory value.

During the pandemic, inexpensive PPE supplies should have been viewed as critical A items requiring a lot of focus, and should not have been outsourced to other countries. Shortages of medical PPE supplies—especially for workers in hospital intensive care units (ICUs)—might have degraded the healthcare provided to patients and led to more deaths. A very high cost-of-shortage.

Observing what is happening with renewable solar panels, the world is largely outsourcing manufacturing to low-cost countries such as China. Treating them like C items. This, in the long run, might put climate change security at risk. Will these panels be reliable enough and will they be able to be rapidly repaired. I have my doubts. Solar panels should be treated as A items.

Why? Because the cost of shortage is much higher than the cost of surplus inventory for renewable energy sources. The cost of surplus is relatively straightforward to determine because it is basically the monetary costs of developing and operating a reliable electric grid fed by non-fossil fuel energy sources to replace fossil fuels—and developed in time to keep the Earth from overheating. On the other hand, the cost of shortage involves a failure to stop the Earth from overheating—with unimaginable costs from the negative effects on the lives of the human race as we know it. Therefore, the renewable energy service part supply chains should ensure that all parts that might cause a malfunction, are treated as A inventory items, with extremely low failure rates and rapid repair processes in place to shorten any downtime. These parts supply chains should not be lean just-in-time (JIT) ones. In fact, they should be brimming with lots of "good" inventory.

As they should, entrepreneurs like the one I met certainly need to be innovative on the renewable technologies to be deployed. However, they ought to make sure to design products and support services that reduce downtime to an absolute minimum. Because if the wind is blowing and the sun is shining, mankind needs all the electricity that can be generated during that precious period, when renewables are replacing fossil fuels.

Innovative approaches to unlocking innovation

Changing market dynamics have increased the pressure on organizations to think more innovatively.

By Ken Cottrill

Ken Cottrill is the editorial director of the MIT Center for Transportation & Logistics. He can be reached at kencott@mit.edu.

Innovation is an integral part of supply chain management. Still, today, rapidly changing market dynamics, often fueled by technological advances, have increased the pressure on organizations to initiate, develop, and adopt innovative ideas.

It's a multifaceted challenge that supply chain organizations address in numerous ways, from developing a culture of innovation to capturing workforce creativity.

New business models

Supply chain professionals discussed many of the approaches at this year's annual Crossroads conference on March 28. The MIT Center for Transportation & Logistics (MIT CTL) organized the event as part of celebrations to mark MIT CTL's 50th anniversary.

The discussions left no doubt that the accelerating pace of change often requires organizations to reinvent the way they do business.

Consider, for example, a trucking company's decision to launch a digital freight-matching service five years ago. At the time, the idea of a traditional, asset-based trucking company getting into brokerage was heretical, and initially, the venture met with considerable internal and external resistance.

However, the competitive case for such a move was compelling, partly because technology had advanced. Moreover, the company was already building portals for shipper customers, and many carriers were visiting its website for market information. Therefore, creating a digital platform for freight was a logical progression for the company.

Disrupting the old-school freight-matching model in this way led to further changes. The service created new possibilities for improving efficiency and transparency by generating a flood of operational data. As these opportunities came to light, the carrier's relationships with many of its shipper customers shifted from tactical to strategic.

It's an example of how changing market dynamics coupled with technological innovation steered a company into unfamiliar territory.

Making such a move was only possible with a culture of innovation to support it. A "cycle of innovation" is woven into the company's corporate culture and drives the pursuit of opportunities to compete more effectively by disrupting business norms.

This culture of innovation is one of the hallmarks of organizations that habitually use creative ideas to stay ahead of the competition. As Fred Smith, founder of FedEx, said during a fireside chat at MIT CTL on Jan. 26, 2023: "If you are in business and you don't innovate, you are in the process of commoditization or extinction."

FedEx nurtures such a mindset in several ways. First, it tolerates failure without betting on the company's future and keeps reiterating the importance of innovation to its existence. Second, FedEx also supports the mavericks who often come up with original ideas. "Great ideas come from strange places," said Smith.

Worker power

But mavericks are just one source of new ideas that companies need to tap into. Practitioners at the Crossroads event also highlighted the importance of their workforces as a source of innovation and mechanisms for mining this creativity and turning it into viable business ideas.

One company described a program that elicits new ideas from employees and implements the best ones. Workers are encouraged to submit ideas online and are offered inducements, including cash prizes and initiatives to recognize contributions that come to fruition. About 1,000 of the 20,000 ideas received have been implemented.

An essential part of the program is a process for evaluating this input. The company has designated a team to assess the stream of ideas using metrics such as cost and feedback from relevant functional managers.

The evaluation part of such programs is critically important. "You have to create an environment so people can throw ideas out and are okay with realistic assessments of those ideas," said a supply chain leader. For example, a plant proposes using a 3D printer to make components, an idea that appears promising on the surface. However, the originators may not have considered the implications of bringing 3D-printed components into contact with highly regulated products. A mechanism for sifting through ideas and subjecting them to sober evaluations before scaling them is essential to idea generation schemes.

Another way to harness employees' creative talents is to use their expertise to help the organization implement innovations such as digital technology. For example, one company designates selected tech-savvy individuals as subject matter experts who answer technical questions from employees needing support when adopting new technology. The designation comes with a badge and recognition that these individuals are experts. The program has proved so successful that the company is considering expanding it to encompass operational issues.

Innovation can be fostered internally by reorienting deeply rooted behavior patterns. For example, a supply chain executive described an initiative to boost the confidence of her team members, especially about how they react when things go wrong. As any supply chain professional knows, snafus are inevitable in today's complex supply chain environment. The aim is to encourage individuals to view disruptions as learning opportunities rather than unwanted crises. Learning lessons from adversity can lead to creative ways to avoid or at least anticipate disruptive events.

Collaboration front and center

Having empowered individuals to be innovative, companies need to ensure they have the right organizational structure to implement actionable ideas.

This can mean breaking down the organizational silos that impede the flow of ideas in enterprises. One leader at the event aims to make his company more agile by eliminating organizational "thickets" that can provide hiding places for groups that resist change.

Also, individuals need to be more open to sharing their expertise, he suggested. In today's highly competitive world, there is a tendency for employees to resist knowledge sharing for fear that this might threaten their positions within companies. This form of selfishness handicaps the creative process.

Another approach to using collaboration to promote innovation is to deploy senior managers as internal consultants. A company at the conference has a team of vice presidents who present new ideas to functional heads and help to implement potential winners. Deploying internal consultants in this way yields several advantages. Senior managers outside of a functional area can bring a fresh perspective. They may not be encumbered by the day-to-day concerns of running a department they are not affiliated with. Also, incumbent functional managers can become so steeped in their departments that they lose sight of new ideas or resist dramatic change.

Collaboration has been a recurrent theme in the broader supply chain community for many years. But finding ways to collaborate effectively across supply chain ecosystems is more important than ever, especially from an innovation perspective.

For example, a market-leading manufacturer is working to change its proprietorial attitude toward internally developed innovations. The company invented a process that makes it easier to recycle plastics and licensed the technology to an external enterprise that is making it available to other companies. Sometimes, the manufacturer will consider open-source options to make its innovations more widely available—an attitude unheard of a decade ago.

Accelerators and speed bumps

The need to unlock an organization's creativity and deliver innovations to the market as quickly as possible can only become more urgent.

Increasingly sophisticated tools are affording individuals more freedom to develop their ideas by, for example, writing code for them. The natural language processing tool ChatGPT is a current—and potentially powerful—example of this new generation of tools.

However, as a company leader emphasized, it is essential to maintain sight of the customer in a rush to innovate. "Don't get enamored with the technology," he advised. "I don't care about AI or digitalization; I care about delighting the customer."

A concern expressed by several executives at the conference is how deepening societal divisions can impede the development, flow, and adoption of new ideas. On a planetary level, the world must come together to tackle global issues. But the executives reported that these divisions are now in the workplace.

Supply chains have changed dramatically in the half-century since MIT CTL started, and the next 50 years promise to be just as transformational. As one leader said, supply chains of the future "will be different than today, but we don't know how."

Reimagine your reverse supply chain: Minimize new 3Rs for environmental sustainability

By Shyam Bhaskar, Ph.D.

Shyam Bhaskar, Ph.D., is a director in the Global Supply Chain Consulting practice with Tata Consultancy Services and can be reached at: shyam.bhaskar@tcs.com.

Reduce, reuse, recycle. These 3Rs are commonly known steps toward waste management and environmental sustainability. However, they are not adequate toward countering the increasing amounts of waste generated by complex global supply chains. These 3Rs are predominantly post-mortem efforts that force a great deal of responsibility on the consumers rather than on the producers themselves.

Reverse supply chains ought to be reimagined for sustainability. We propose a design framework that minimizes the new 3Rs—refuse, recall, and returns—which in turn complement the existing reduce, reuse, and recycle initiatives for effective environmental impact.

Is the status quo—maximize reduce, reuse and recycle initiatives—adequate?

Efforts to design sustainable supply chains are receiving traction globally. The status quo focuses on a post-mortem strategy built on the 3Rs—reduce, reuse, recycle.

While these are laudable sustainability efforts, they may not produce the desired results for the environment. A finding by Columbia Climate School indicated that of these 3Rs, most consumers focus on recycling initiatives. Unfortunately, many such recycled items ultimately end up in landfills and choke the environment due to contamination, unfit for further use. A similar study by the United Nations pointed out that recycling is not going to be adequate to contain the accelerating erosion of the environment. This prompts a need to transform the way we manage supply chains.

While forward supply chains are being smartly streamlined and are part of sustainability initiatives, refuse, recall, and returns are complex loops that have a very high environmental impact, but are difficult to address. A new design approach is required.

Refuse that includes obsoletes, single-use packaging materials, plastic containers, information materials and even QR codes that get printed for tracking contribute to a significant amount of municipal waste. Per an EPA statistic, containers and packaging contribute to an astonishingly higher portion—more than a quarter—of the municipal solid waste.

A United Nations' study estimates that plastic pollution is expected to contribute a mammoth 6.5 gigatons of CO_2 equivalent greenhouse gas emissions by 2050. E-commerce is accelerating the plastic pollution problem with large amounts of plastic used for packaging.

Recall is another area in the reverse chain that affects the environment in multiple ways. The recent infant formula shortage, for example, created chaos in forward supply chains. That chaos had the unintended consequence of impacting the environment with additional carbon emissions owing to shipping back the recalled products. Further, it resulted in flushing out or filling land with contaminants.

As for returns: Per a National Retail Federation survey, while the retail trade grew by 11% in 2022, on a year-over-year basis, returns increased a whopping 70% during the same period. Online purchase returns are four times more than in-store purchase returns. An article published by CNN highlights the dangers of returns, quoting that returns account for 10 billion pounds of landfill in addition to burdening the environment with 30 million tons of CO_2 equivalent greenhouse gas emissions owing to reverse shipping.

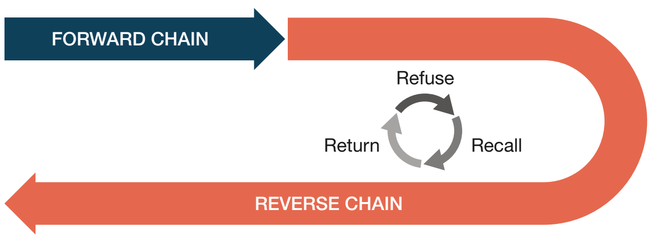
Minimize refuse, recall, and returns

We propose a framework to minimize the environmental impact by focusing on refuse, recall, and returns which we cover under the broader context of the reverse supply chain (see Figure 1). This framework not only acts as a pre-mortem strategy, but also holds companies and their supplier base accountable toward sustainability initiatives right from concept through to cash.

Companies should reimagine reverse logistics with a more preventive vision focusing on an objective that minimizes the new 3Rs: refuse, recall, and returns. Doing so also reduces the onus on the consumer and rightfully shifts the responsibility onto the company and related supply chain providers.

FIGURE 1

Reimagining the reverse supply chain



Source: Authors

In terms of refuse, the World Economic Forum cites ways to limit packaging either by direct elimination of unnecessary packaging or using plastic substitutes such as refills and eco-friendly and biodegradable packaging. Design for minimal refuse would be a way forward to incorporate such alternatives at the design stage itself.

To address recall, companies and producers must focus on improving quality evaluation and performance measurement to meet stringent quality norms. This can be done by imposing quality controls at various nodes of the supply chain. In addition, companies should leverage technology for traceability and end-to-end visibility to monitor quality across the supply chain and respond quickly to variation. Blockchain can be used for traceability and data science techniques can be leveraged for proactive alerts and targeted preventive, even prescriptive, measures.

Returns can be reduced by enhancing the consumer experience. With companies increasingly integrating artificial intelligence (AI) and machine learning (ML) tools in digital operations, several solutions can be used to provide better experiences. For example, vendor ratings and virtual mirrors for apparel fitting may be used to improve efforts toward reducing returns in online shopping.

Sustainable supply chain strategy ought to incorporate the objective of minimizing these new 3Rs—refuse, recall, and returns—in order to reduce the burden on the environment.

What can we do?

Buckle up. The impact of supply chains on the environment calls for a radical re-look. Reduce, reuse, and recycle are post-facto techniques suited for forward supply chains where consumers are held accountable for sustainability efforts. However, these efforts by themselves are not enough. It is high time that companies take ownership to initiate and implement pre-mortem sustainable practices and reduce their carbon footprint. A holistic sustainable supply chain (see Figure 2) would encompass the following two steps.

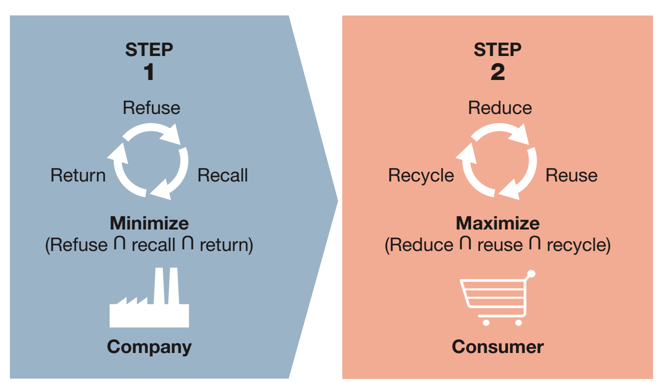
Step 1: Minimize refuse, recall, and returns. The dominant player is the company.

Step 2: Maximize reduce, reuse, and recycle. The dominant player is the consumer.

Adopting these new 3Rs as an antecedent would not only help reduce a company's carbon footprint, but also significantly minimize the economic impact of the reverse chain by decreasing the cost of quality and wastage. Instead of solely relying on maximizing reduce, reuse, and recycle initiatives, the new 3Rs would serve as a meaningful predecessor by minimizing refuse, recall, and returns that builds a robust sustainable value chain.

FIGURE 2

Holistic sustainable supply chain



Source: Authors

By holding both ends of the supply chain accountable, sustainability efforts are more likely to bear satisfactory results and significantly reduce the burden on Mother Nature.

THE PSYCH IN NEGOTIATIONS:

Using human factors to attain superior outcomes

BY MARK TROWBRIDGE AND MELANIE TROWBRIDGE

"Negotiation is empathy. It's almost trite to say that if you can't put yourself in the seat of the other person you're speaking with, you're not going to do well."

The editor of *Supply Chain Management Review* made an unusual request for the May 2023 edition. He asked this married couple to write an article about psychologic principles to empower negotiations. This topic does fit us. Mark regularly teaches conference audiences and corporate procurement groups on best practices in negotiations. Melanie is a medical doctor practicing in the field of psychiatry and teaching at the undergraduate, graduate and post-graduate levels as a tenured professor, as well as regularly speaking in the educational and medical communities on matters relating to intrapersonal and interpersonal relationships. So, let's get started.

The place of negotiations in today's procurement toolbox

Despite all the "eTools" in today's supply management toolkit, negotiations are still the most utilized way to establish (and improve) complex business relationships. Most senior supply management professionals agree that negotiations are the preferred methodology for dealing with alliance and strategic types of supplier relationships—ones that account for a large proportion of supply chain expense.

This truth has been further compounded during the last two years as the balance of power in typical commercial relationships has shifted toward the suppliers, in combination with COVID supply chain disruptions and energy-induced inflationary price increases.

Let's face it, a greater portion of the average firm's procurement relationships have been exposed to renegotiations than ever before. It was decades ago that we last saw *force majeure* language being deployed in the commercial contracting environment anywhere close to current levels.

By Mark Trowbridge, CPSM, C.P.M. MCIPS, and Melanie Trowbridge, M.D. child, adolescent, adult psychiatrist

With so much pressure on buyer/supplier relationships, how can procurement leaders be more successful in the process of negotiations? How can professionals expand the power of negotiations beyond the boundaries of MDO (most desirable outcome), LAA (least acceptable agreement), and BATNA (best alternative to a negotiated agreement)? A greater understanding and incorporation of psychological elements may be the key to success.

Jack Lew, the 76th U.S. treasury secretary once observed that: "The most critical thing in a negotiation is to get inside your opponent's head and figure out what he really wants." This article will discuss four principles that influence the mind of our counterpart and our relationship with them. They are as follows.

1. Be prepared—get beyond positions by understanding the supplier's needs;
2. appreciate our counterpart's personality traits and our own;
3. reading (and sending) non-spoken body language; and
4. using interrogatives to appropriately shift the other party's paradigm view.

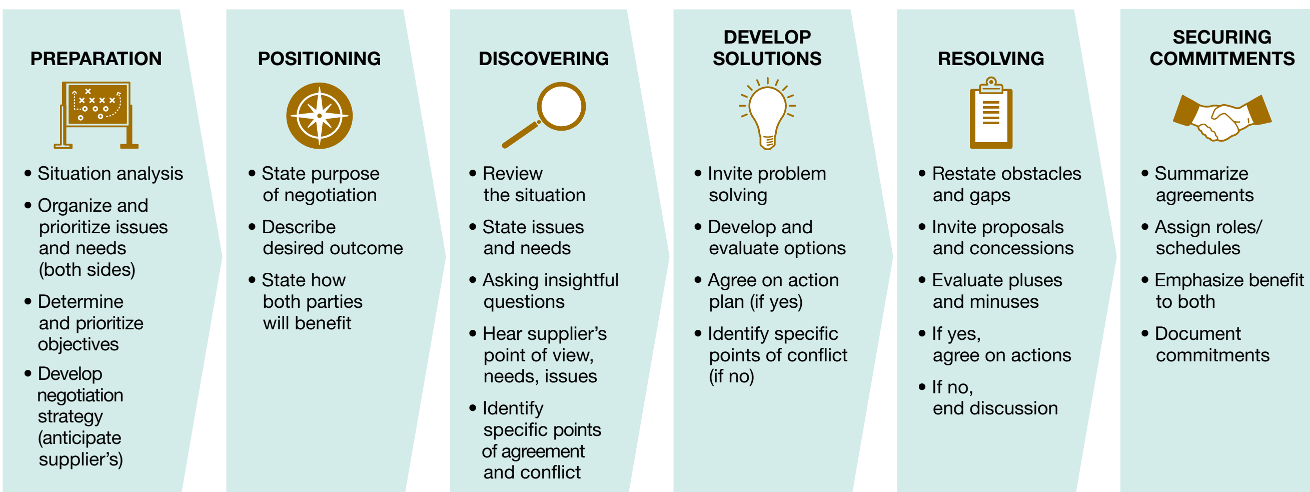
Technique #1. Be prepared: Getting beyond positions by understanding the supplier's needs

Too often, the buyer and seller in a commercial negotiation adopt positions from the first interchange. Being positional is illustrated by an unwillingness to consider other alternatives, and often results in limited accomplishment through the negotiation process. But the most-skilled negotiators realize that willingness to explore a variety of options will drive better outcomes. We can be more successful in doing this when we understand the needs of the supplier.

This involves some detective work up front. It has been said that "preparation should take 75% of the overall time in a negotiation process." This is absolutely true. The better-prepared our negotiation team is, the better the outcome of the negotiation. The phases of a successful negotiation can be seen in the Figure 1 process chart.

FIGURE 1

Negotiation process



Source: Advanced Procurement Negotiation Training Masterclass, 2000-2023, Strategic Procurement Solutions LLC

One method of understanding a supplier's basic needs is via advanced detective work into the supplier's business goals and their negotiation team members' personal motivations. Ury, in "Getting to Yes," encourages us to think of wise negotiation solutions in terms of reconciling "interests, not positions." So, while a supplier may be committed to their position, our taking time to discover their interests (needs) can shift the negotiation in a positive direction. The most powerful interests are often basic human needs described by Maslow in his famous hierarchy (see Figure 2).

Maslow's hierarchy anticipates that human beings will prioritize basic needs and psychological needs first. Once we have a source for nutrition, we seek stability and safety; often found in a regular job and a place to live. Once safety is established with a steady source of income, most people seek to belong socially; belonging as part of a work team, religious body, etc. But Maslow also recognized that human beings are willing to step out on

their own when accomplishment can bring a level of personal achievement. And finally, some people are motivated to attain an even higher level of fulfillment called self-actualization illustrated by motivation to innovate.

With some advanced detective work, the procurement negotiation team may be able to identify the level of need fulfillment at which the opposing negotiation team is operating.

- Is the supplier organization struggling to survive financially? Could this contract move them toward improved health (safety need)?
- Has the supplier's negotiation team been told by their CEO that getting an agreement with your firm is a requirement for their annual sales recognition award program (belonging need)?
- Would the ability to list your firm as a customer increase the supplier's credibility in the marketplace (esteem need)?
- Might being selected to defend your firm in a key lawsuit allow a law firm to set legal precedence (self-actualization need)?

To estimate the supplier's level of need fulfillment, more detective work is needed. There is no good excuse for being less-prepared than our sales counterparts.

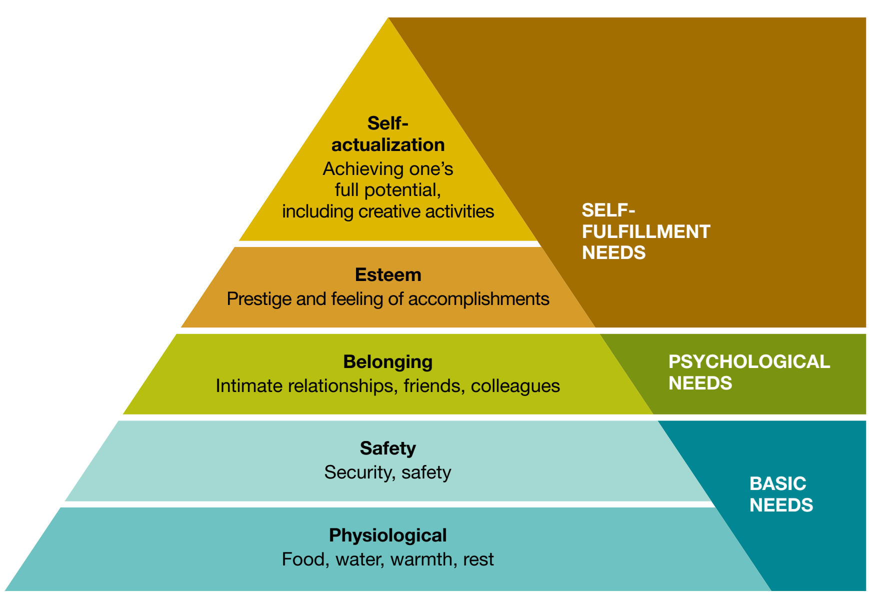
During a break in a $100 million medical equipment purchase negotiation process, a hospital group's lead negotiator noticed that one of the manufacturer's negotiation team members had left their notebook open. The first page was a copy of the hospital's main negotiator's LinkedIn profile page covered by handwritten notes. The message was clear; the supplier had done their homework. Shame on the buying organization for not exercising the same due diligence.

The procurement team can easily spend time doing the following before a key negotiation.

- Explore the supplier's website to learn about product lines, customers, and business announcements.
- Understand trends in the supplier's major cost drivers (for example, if chromalloy steel is a component in the supplier's products, you'll need to understand the price trends leading up to, and forecasted into the future, for chromalloy steel).
- If publicly traded, download the supplier's annual financial reports to understand their stated and planned business direction. If you are responsible for a key supplier relationship, just buy a share of the firm's stock in your own brokerage account to automatically receive these reports. In addition, you can download stock analyst reports that provide insight into financial and business challenges/opportunities that may exist for the supplier.
- Track essential data elements about the supplier. It is especially important to have real-time visibility into financial stability, negative news media exposure, bankruptcies, lien filings, legal judgements, criminality reports, presence on governmental watchlists, etc. *[Author's note: email Mark for the name of a provider that will track all these for every one of your suppliers at no cost.]*
- Call any customer references provided by the supplier (during RFP or standalone processes). Use these conversations to ask more than "is this a good supplier?" Instead, leverage the discussion to learn about the supplier's potential needs like typical approach during negotiations, tactics to be prepared for, details of cost structures, concessions gained by the reference, etc.

FIGURE 2

Maslow's hierarchy of needs



Source: Advanced Procurement Negotiation Training Masterclass, 2000-2023, Strategic Procurement Solutions LLC

• Visit the LinkedIn profile page of each person on the supplier's negotiation team to understand their backgrounds and potential perspectives. Where did they attend university? What degrees do they hold? Where do they live? Married? Children? Where else have they worked? What social organizations do they belong to? Who do they follow online?

Technique #2. Appreciating our counterparty's personality traits as well as our own

The term personality describes the unique patterns of thoughts, feelings, and behaviors that distinguish one person from others. It is a product of both our biology and environment.

Those in the field of psychology often utilize five elemental components of human personality known as the Big 5, which is widely accepted today because this model presents a framework for understanding the main dimensional traits of personality. These traits are often easily remembered by use of the acronym OCEAN.

• O = Openness
• C = Conscientiousness
• E = Extraversion
• A = Agreeableness
• N = Neuroticism

Experts (Fiske, Norman, Smith, Goldberg, McCrae, Costa) found that these OCEAN traits are an accurate portrait of the human personality and are often applied successfully across cultures. These elements can be evaluated along a range between two extremes and recognizes that for each, real persons lie somewhere between the extreme ends of each range. Think of it this way. "The degree to which I am _______."

Guess what? We all have some degree of each one of these OCEAN elements. Take a few minutes sometime and take a look at yourself through the lens of this tool and see what you discover. Ask yourself how your unique blend of these traits can serve to limit or empower your role as a business person; and especially your effectiveness as a negotiator.

How can the Big 5 be an added tool in the negotiation collaboration with our counterparts? Recognizing that it is not used to diagnose but is used as a reflective tool is important. For instance, in the field of organizational behavior, tests based on the Big 5 are used in employee assessment tests for purposes such as understanding and guiding individual success within the team.

But based upon your past experiences with the supplier's representatives, you may be able to use OCEAN to make some assumptions that influence how you sequence the topics in a negotiation, ask and answer questions, challenge the status quo, etc. How can the negotiation be strategically structured to best impact the opponent given their personal traits?

You may be inclined, at first glance, to think it best to be extremely high in agreeableness and that there is no significant place for a low score in that area. Let's take a look. Because agreeableness refers to a desire to keep things running smoothly/a focus on the other/trusting, a higher score might imply that you are an adapter while a lower score may indicate that you are a challenger. Might there be an appropriate place for each? Let's look at one more. A lower score in openness, meaning a focus on the new/curiosity, might signify persevering traits. A higher score may suggest exploring traits. Again, the perfect score may not exist with this tool. However, understanding the score may be a worthwhile exercise to enhance our negotiations because we better understand ourselves and others.

We have recognized the value of a better appreciation of personality traits and styles as a key to our negotiation process. Another approach that personality research has provided is emotional intelligence or emotional quotient (EQ). We see Maslow's hand once again in his early focus on emotional strength, but it was in 1990 that Salovey and Mayer described emotional intelligence as "the ability to monitor one's own and others' feelings and emotions, to discriminate among them, and to use this information to guide one's thinking and actions." In the negotiation arena, we can see this fleshed out in our ability to perceive, interpret, demonstrate, control, and use emotions to relate to others constructively. The topic of emotional intelligence has continued to capture interest in many fields, including business, as the ability to express and control our own emotions is essential. Equally important is the ability to understand, interpret, and respond to the emotions of others (i.e., the supplier).

What are emotional components we should be evaluating before, during and after negotiations with a supplier?

• **Perceiving emotion.** Accurate perception is key; verbal and non-verbal language need consideration.
• **Reasoning with emotion.** Emotions promote thinking and cognitive activity; emotions play a part in prioritizing what we attend to and vice versa.
• **Understanding emotions.** Our perceived emotions

can carry a variety of meanings.

• **Managing emotions.** Regulation of and responding appropriately to emotion in ourselves and others is vital.

Some of us come by these skills naturally, while others would like to develop EQ skills more fully. The great news is that there is good data to suggest that EQ training can improve EQ abilities in workplace business settings.

Tips for us all include the following.

• **Listen, listen, listen.** Actively give full attention to what others are telling us both verbally and non-verbally.

• **Reflect, reflect, reflect.** Assess the verbal and non-verbal messages you are delivering.

• **Attend.** Consider your emotional state and how that informs your behavior.

• **Get feedback.** As the proverb says: Iron sharpens iron. Appropriate and qualified feedback can facilitate further insight in both EQ areas as well as personality trait areas.

Technique #3. Reading (and sending) non-spoken body language

Peter Drucker once pointed out: "The most important thing in communication is hearing what isn't said." Behavioral psychologist Dr. Albert Mehrabian's extensive research on nonverbal communications resulted in the "7-38-55 Rule," whereby only 7% of all communication is done through purely verbal communication, whereas the nonverbal component of our daily communication, such as the tonality of our voice and body language, make up 38% and 55% respectively.

While this formula applies to certain situations, it does not claim to apply to all. It does remind us that a single gesture or comment does not necessarily mean something. But it certainly suggests that we pay attention to nonverbal cues to get an accurate understanding of a counterparty's communication being delivered.

So how can that translate into a formal commercial negotiation process? We may be missing the important clues as to what the counterparty is thinking. For some typical gestures, Figure 3 illustrates probable meanings.

An obvious takeaway is that the medium we choose for a negotiation affects the nonverbal information we perceive. In order of preference, negotiation mediums rank in the following order: (1) negotiations in person, (2) web video [i.e., Zoom, Teams, etc.], (3) telephone, (4) email/text. The obvious difference is the curtailment of nonverbal cues as proximity shrinks.

A number of years ago, Mark successfully led a team of consultants in helping a Top 5 global tire manufacturer reduce their indirect expenditures by $25 million. One key opportunity was to re-negotiate a $20 million contract for loading dock services. On the appointed day, the president and the EVP of the provider company flew into town on a corporate jet to begin negotiations with Mark and his client in an early afternoon meeting. The negotiations began with Mark's procurement client starting to explain that the goal was to restructure the relationship from an hourly rate per loading dock contractor into a flat rate for filling different shipping containers (railroad cars, TL and LTL). But Mark noticed uncomfortable body language from the supplier's executives. So, he paused the negotiation, and inquired whether they were feeling discomfort.

FIGURE 3

Non-verbal cues

GESTURE	PROBABLE MEANING
Clearing throat often	Untruth
Closed fists or hands clasped hands	Anger/Frustration
Tilting the head	Receptiveness/Thoughtful
Crossing the arms and/or legs	Not Receptive/Defensive
Fidgeting with pen or pencil/Looking down	Lack of confidence/Impatient
Gritting teeth	Anger
Standing up straight/Walking briskly	Confidence
Looking at watch	Impatience
Eye contact	Sincerity
Mirroring body position	Identifying with opponent
Nervous laugh	Unspoken concerns
Open hands	Sincerity
Rolling of eyes	Impatience/Disbelief
Shifting of eyes/Rubbing eyes	Deceit
Sitting forward on chair	Interested in discussion
Stern staring	Aggressive/Controlling
Rubbing hands together	Excited/nervous
Touching face, collar, tie, sleeves	Nervous

Source: Advanced Procurement Negotiation Training Masterclass, 2000-2023, Strategic Procurement Solutions LLC

The supplier's president shared that the tire company was 90+ days in arrears on $250,000 in invoices. That morning, they had met with the tire manufacturer's accounting VP about the overdue invoices, and had been told: "We'll get it cleaned up eventually. Just be patient." That had shocked the two executives.

The tire company's procurement leader responded by saying he would try and work with the accounting VP to clean up the situation. Then he suggested they continue the rate discussion. But Mark stopped the negotiation again, and asked whether the executives could be back in the area the next week. They said yes. To his client's consternation, Mark delayed the rest of the negotiation until the following week.

The next week, the supplier's president was handed a check for the overdue amount. Mark and his client then proceeded to negotiate a win-win agreement that achieved 33% less cost per shipping unit for the tire company as well as 30% higher productivity from the loading dock contractor. It pays to watch body language.

Technique #4. Using interrogatives to appropriately shift the other party's paradigm

Big words in this title, but simple concepts. An interrogative is simply to ask a question. Same Latin root word as interrogate. Asking insightful questions is a key to the third phase of a successful negotiation. The term paradigm is simply how a negotiation party views a topic at hand—it's their perspective. Getting the other party to answer key questions can sometimes change their perspective on the negotiable elements.

The best negotiators are clever interrogators. They listen carefully to the other party's answers. They seem to follow the old guideline that "God gave us two ears and one mouth, and we should use them proportionately."

The authors dated long distance (Ohio and California) for more than a year before getting married. That meant they spent a lot of time talking on the phone. They both grew in their conversational abilities, but Mark grew more. Part of his growth was learning ways to pose Melanie better interrogatives. For example, early in their relationship, Mark might begin a conversation asking: "Did you have a good day today?" That left Melanie with two choices—yes or no. Then awkward silence. A better question might have been: "What was the most interesting thing about your day?"

How often has an unexperienced procurement person asked a dead-end yes or no question like: "Can't you do better on the price?" Then they wait for the answer, until a smug supplier sales executive just says no.

There are a variety of general question styles that Mark's colleagues train clients to use to achieve better results (they also train procurement leaders on how to respond to tough questions from suppliers).

- **Pre-questions** can set parameters for a negotiation session. For example, sending an email to the supplier like the following: "We're looking forward to meeting with your team next week. Please email me in the next couple of days to let us know what your goals, objectives, and timelines are and how you propose we can best resolve the product quality issues. This will help me prepare an agenda for both our teams."
- **Suggestive questions** can be designed to lead an opponent down pathways attractive to the buying organization. For example: "Would X work better for you or Y?" The trick is that both X and Y are options attractive to the buyer. By answering the question as asked, the seller has already compromised their position.
- **Leading questions** are typically answered with a yes or no (sometimes leading to further clarification). They can force the other party into a corner where they must reveal something foundational to the rest of the negotiation. Examples might be:
  - *"You do have some flexibility on the price, don't you?"*
  - *"You do want a five-year agreement, don't you?"*
  - *"Your firm doesn't have any problem with transferring IP rights to our firm, do you?"*
- **"What's in it for me"** questions cut right to the chase and can sometimes shift the seller away from a strong initial position to one of trying to justify their suppositions. One example is: "Our team has spent several weeks trying to work out details of a potential agreement with your firm. But before we spend any more time negotiating, we'd like your firm to restate the reasons we should be moving forward with this deal. After all the concessions, what's really in it for us?
- **"What-if" questions** are beautiful questions to ask. The phrase is effective because it extracts a discussion from the opponent about a concept … without getting positional. An example might be, "What if we both put inspectors on site during the last three months of the construction project?"

An expanded approach to the interrogative concept is that of motivational interviewing (MI) that nicely intersects with the negotiation flow chart at the beginning of this article.

Some applicable techniques borrowed from MI may enable a negotiator to creatively facilitate a change process together with the supplier's team. An appropriate paradigm shift may be the result by coming to a collaborative realization of a different pathway.

The foundation of motivational interviewing is that it is impossible to have an unmotivated counterparty. Every human being is motivated toward something. The question is what? Motivational interviewing is a person-centered, goal-oriented approach for facilitating change through exploring and resolving ambivalence. This dynamic counseling approach was first established by Rosengren and Miller to help patients make better personal choices. Some of its techniques are now successfully applied to other fields such as business and education. As a psychiatrist, Dr. Melanie is quite familiar with MI's successful use in doctor-patient relationships as well as educator-student interactions.

What are some MI techniques that provide opportunities in a negotiation pathway? MI is a negotiator's friend by being an additional communication tool. It encourages a collaborative conversation to strengthen motivation toward growth and change; it can move a situation from why to how. MI provides intrinsic and extrinsic motivation toward change behavior, invaluable in any negotiation process. How? It honors individuals as well as partnership. It recognizes strengths/competencies to scaffold growth and change and enhances interpersonal collaboration.

Supply chain negotiators can use the process of motivational interviewing through a sequence of steps abbreviated by the acronym of OARS.

• **O = Open-ended questions.** These can lead the supplier in identifying possible solutions.

- Recognize a problem: How do you feel about the large number of late deliveries this month?
- Express a concern: What worries do you have about the rising diesel costs?
- Intention to change: What would you like to see happen with our company's expansion into the Northeast?
- Recognize optimism: What makes you think that now is a good time to try something different?
- Elaboration: In what ways? Tell me more. What does that look like? (Listen for ways the supplier may be willing make a shift.)
- Favorites: "On a scale of 1 to 10, where 1 is not at all ready to make a change and 10 is ready to make a change, where are you right now?" Note: It is rare to hear a response of 1. So, even if there is a 2 or 3 given, this provides a great opportunity to ask: "Why are you at a 2 and not a 1?" "What might happen that could move you from the 2 to a 4?" "What may happen if things continue as they are?" "If you were successful in making the changes you want, what would be different?"

• **A = Affirmations.** Genuinely notice and appreciate specific strengths/actions raised in the supplier's question responses. Procurement's negotiator needs to recognize value by tying pros and cons together. Even if all of the elements in the supplier's responses are not positive, take time to express authentic appreciation for the positives that their negotiator does raise. Doing this sets up collaboration and trust.

• **R = Reflections.** These are statements NOT questions. They often yield more info and deeper understanding as they reinforce correct perceptions of the supplier's responses.

- Hear what they are saying.
- Make an educated statement at their meaning and / verbalize this perception in a statement form such as: "It sounds like you are ready to reduce our pricing if we can simplify our quality inspections." "So, you are saying that you are having trouble with the avail ability of copper components." Or, "It sounds like you are feeling frustrated with our habit of placing multiple orders once monthly rather than spreading them out weekly."
- Wait for validation. Don't say anything else until the supplier responds. In this case, silence is golden.

• **S = Summarization.** Key elements of commonality can be highlighted that facilitate strategic agreement. Summarizing points of agreement helps both parties recall and reflect upon the key points. Emphasize your counterpart's comments and views that can move them emotionally and logically to better solutions. Focus on fundamental motivations and interest.

As Marc Randolph, the founder of Netflix, once said: "Negotiation is empathy. It's almost trite to say that if you can't put yourself in the seat of the other person you're speaking with, you're not going to do well."

The ability to understand a supplier's psych and influence what they are thinking is key to a successful negotiation. Each of the techniques in this article can empower the phases of a productive supplier interchange. These four methods can help to alter a supplier's perceptions in the negotiation process. We hope that they prove to be useful to the readers of this article.

CONTRACTING *in the* NEW ECONOMY

Companies are turning to formal relational contracts to boost collaboration and drive innovation with strategic suppliers.

BY KATE VITASEK AND DAVID FRYDLINGER

The phrase "the new economy" was popularized in a 1983 cover article in *Time*, titled "The New Economy," which described the transition from heavy industry to a technology-based economy. More than 40 years later, the phrase is still used to describe recent business trends and evolutions affecting how organizations do business. If the global pandemic taught us anything, it is that the phrase "business as usual" has been replaced by "business happens."

Today's new economy is characterized by faster, more complex, and intertwined trading partner relationships. The need for flexibility is paramount. But so is the need for innovation and sustainable supply chain solutions. In truth, supplier relationships are crucial to a company's long-term success. Yet today's business leaders are facing a dilemma—traditional purchasing approaches and contracts don't work in complex strategic relationships where the parties are highly dependent on each other, future events can't be predicted, and flexibility and trust are required. Conventional approaches undermine—rather than promote—the partnership-like relationships needed to cope with uncertainty.

The contracting paradox

Of all the many traps and possible pitfalls in negotiating a complex contract, one of the most insidious is the "contracting paradox." The contracting paradox is the delusion that we write contracts to make plans, but we cannot actually plan accurately. And, as a nice twist, we trick ourselves into believing we can plan.

Why is the contracting paradox such an easy trap to fall into for contracting, procurement, and outsourcing management experts? As experts, their task is to write forward-looking contracts that attempt to cover every risk and limit every possible liability. In short, they strive for the complete contract that addresses every "what-if" possibility. But despite their best efforts and contracts, they are not bulletproof—and never will be.

The global pandemic has brought the contracting paradox to the front and center for many supply chain professionals. Simply put, complex contracts are inherently incomplete. It's not possible to plan for every contract eventuality. Instead, it's time to embrace a flexible contracting framework designed to keep the parties continually aligned when "business happens."

We—along with other thought leaders like Nobel Laureate and Harvard University Professor Oliver Hart, and leaders of World Commerce and Contracting—are challenging organizations to rethink their procurement and contracting approaches for their most crucial supplier relationships. But rethink to what?

The book "Contracting in the New Economy" shares dozens of leading research studies that point the way to using a formal relational contract. After nearly two decades of research into relational contracts, the University of Tennessee collaborated with World Commerce and Contracting to put a definition to the concept. It is as follows.

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A legally enforceable written contract establishing a commercial partnership within a flexible contractual framework based on social norms and jointly defined objectives, prioritizing a relationship with the continuous alignment of interests before commercial transactions.

The hallmark of a formal relational contract specifies mutual goals and establishes governance structures to keep the parties' expectations and interests aligned over the long term. So, when business happens—there are guiding principles and processes to help the parties work through whatever the new economy can throw at them in a collaborative manner.

Five steps to a relational contract

Researchers at the University of Tennessee developed a simple five-step process for creating formal relational contracts. The five steps are as follows:

Step 1: Lay the foundation
Step 2: Co-create a shared vision and objectives
Step 3: Adopt guiding principles
Step 4: Align expectations and interests
Step 5: Stay aligned

Combined, the steps shift the focus on negotiating from "this deal" to how the parties can collaborate to create success in the relationship. A linchpin for success? Before you ever start negotiating any aspects of the deal (step 4), slow down and negotiate the foundation of your business relationship.

Step 1: Laying the foundation

This phase focuses on negotiating the foundation of the relationship first and then proceeding to the details. Establishing a partnership mentality is pivotal to sustainable cooperation. When both parties begin the negotiations with the genuine partnership as a formal (written) feature of the contract, it creates room for trust, transparency, and high-level aspirations to flourish—rather than an inherently adversarial mindset. Laying this foundation focuses on outcomes, not transactions, in the earliest phase of the partnership.

Step 2: Co-creating a shared vision and objectives

This starts with identifying specific goals and concerns. Then, these specific desired outcomes are complemented by clearly defined relationship-management processes. Finally, both parties (not just the one with the upper hand) need the space to explain their desired outcomes and goals as well as tactical and measurable objectives. This can be thought of as focusing on the what, not the how. Essentially, in step 1, negotiating parties agree to go on a journey together; in step 2, they draft a roadmap for where they both want to go.

Step 3: Adopt guiding principles for the partnership

Once parties have clearly defined a set of measurable outcomes, adopting guiding principles can help preemptively steer away from potential potholes. These principles are designed to avoid value-eroding friction in the partnership at all costs. No one wants to be treated unfairly—or leave themselves open to exploitation. Likewise, the more unknowns in the picture, the higher the risk. Another phase of the negotiation tries to head off tit-for-tat behavior and preemptively rewards reciprocity.

Step 4: Align expectations and interests

While we can think of the guiding principles as a compass telling us which direction we're going in, aligning expectations and interests demands more instruction. We need more detail than an arrow pointing north, south, east, or west; it's time to hammer out the details. This demands full transparency and applies to all terms and conditions of the relational contract, such as responsibilities, pricing, metrics, etc. It also underlines a problem-solving mentality instead of a negotiation mentality.

Step 5: Stay aligned

Staying aligned requires robust governance mechanisms that hold the contracting parties accountable for living to their intentions. Think of it this way: if the shared vision and objectives are the beacons of the relationship, governance provides the structure and mechanisms for the parties to stop and redirect their efforts when detours occur. This involves both formal and informal governance mechanisms.

From research to results

A growing number of organizations, such as BP, are successfully reimaging their strategic relationships using the University of Tennessee's formal relational contracting process.

BP has a long history of outsourcing facilities and real estate management services. BP's total facilities management portfolio includes more than 132 locations in 20 countries—most of which were outsourced to four primary service providers. Like most organizations, BP's procurement organization used a competitive bid process to test the market to ensure it received the best deal from suppliers. The bid process was named Project Apollo, and a request for solutions (RFS) was issued to seven supplier candidates who could potentially manage over 6.8 million square feet of BP's corporate real estate.

When Wendy Cuthbert joined BP as global head of workplace solutions in late 2019, Project Apollo was well underway. She thought to herself. "We have some really good suppliers—but we are not challenging ourselves to think outside the box." Cuthbert came to BP as an outsider. "We were issuing an RFP to the same suppliers using the same approach we had in the past," she recalls. "So, nothing was really changing besides the fact that we had structured to bid where the smaller parts could potentially be bundled with a global supplier. We hadn't looked at different sourcing models such as Vested. I tapped into my network, and one of my old commercial managers suggested I contact the University of Tennessee to learn about the Vested methodology for creating a formal relational contract."

The team got a boost when Bernard Looney took the helm as BP's CEO in February 2020. Looney's vision was the most far-reaching transformation in BP's 112-year history—to transform it from an international oil company to an integrated energy company by shifting BP's focus from producing oil and gas resources to one that delivers energy solutions. BP aims to become a net-zero company by 2050 or sooner.

After much soul-searching, BP decided to do something never done before at the company—create a formal relational contract. The first step on the journey would be to pick a partner to help BP reimagine its entire workplace solutions and ultimately help contribute to the zero-emissions goal.

Laying the foundation

Mike Jackson, BP sourcing manager, was the lead procurement person on Project Apollo. He remembers how the nature of discussions with potential suppliers changed as BP moved into the final supplier selection phase of the RFP, where BP would begin to lay the foundation of the partnership.

"One of the things we learned from working with the University of Tennessee is that culture fit was essential when picking a partner. When we issued the final phase of the RFS, we consciously assessed the potential partners using six criteria as part of the Partnership Assessment. In essence, the Partnership Assessment helped us quantifiably score the fit and cultural potential of the partners." (See Figure 1 for high-level criteria used.)

It would also mean having more transparent discussions. For Jackson, the concept of creating guardrails upfront was strange. "In Vested, we were taught to

FIGURE 1

BP partnership assessment criteria

PARTNER ASSESSMENT CRITERIA

CRITERIA	FOCUS
Alignment to BP values	Did the supplier demonstrate an **alignment** to BP values and culture?
Alignment to vested approach	Did the supplier demonstrate an **understanding** of vested and approach the session in this manner?
Confidence and trust	How confident are you in the supplier on delivery and do you **trust** in the supplier's **capabilities**?
Adaptability and flexibility	Did the supplier approach the session in an **adaptable** and **flexible** style?
Responsiveness	How much did the supplier **listen** and **respond** to feedback given from the check-in session? Did they respond appropriately to our written questions?
Innovation	How well did the supplier demonstrate **innovative** ideas?

Source: Authors

be transparent and put our guardrails on the table to begin with. It felt weird because, for a traditional procurement person, when you say we will share our guardrails, that's a big no-no normally because you are taught to keep our position close to your chest so you can use it for leverage. However, when you think about it, it really pits the buyer against the supplier. So, while setting guardrails upfront felt weird, it worked well and helped us get great results," he said.

Commercial real estate firm JLL was ultimately selected as the partner of choice during the first week of June 2020 with the goal of working with BP to reimagine workplace solutions across the globe. Dominic Soocoormanee, JLL's sales and solutions development director, was excited about where BP was headed. "BP had been on track to buy the same services in exactly the same way using the same type of contractual relationships. BP's reimagined mandate—combined with the UT Vested methodology—created the perfect storm for driving real change in how BP delivered workplace solutions. This was very exciting to JLL," he said.

A key part of that perfect storm was shifting from four primary suppliers with the goal of having one global supplier that would transition in waves. In addition, it would mean BP and JLL would create a joint deal architect team to create BP's first-ever formal relational contract. A cross-functional team of BP and JLL worked side-by-side to translate the intent of the relationship into a win-win contract that applied the key constructs of a relational contract.

Co-creating a shared vision and objectives

Alignment of the relationship kicked into first gear when BP and JLL began to create their shared vision and create desired outcomes for the partnership. Early in the process, BP and JLL began brainstorming names for their partnership. The name that stuck was "wevo," short for workplace evolution. Figure 2 shares the wevo shared vision and six high-level desired outcomes that would become the raison d'etre for the partnership.

Adopting guiding principles for the partnership

Besides defining the end-game shared vision and desired outcomes, the partners also adopted guiding principles for the wevo partnership, which were formally incorporated into their contract. But the guiding principles were far more than just words in a contract; they were the basis for making fair and balanced decisions for all aspects of the contract and are used post-contract signing to guide the parties' behaviors for working together. Figure 3 shares the wevo guiding principles.

FIGURE 2

Wevo shared vision

Source: Authors

Dave Benbow, JLL global account director, reflects on the power of the guiding principles. "The guiding principles are huge benefits because they are not smoke and mirrors. They are fundamental to how we should work together as a partnership. When we started to look at the partnership through the lens of the guiding principles, it forced us to think and act with the mindset of 'what can we do together' and 'how can we create an environment that is truly a sustainable win-win.' The guiding principles set the tone for everything we did," he said.

FIGURE 3

Wevo guiding principles

Reciprocity	In respecting one another's strengths, we will strive to make exchanges that are **mutually beneficial to the parties**. We will not make any demand upon the other that we ourselves are not willing to return in kind. We recognize that reciprocity lies at the heart of this relationship.
Autonomy	In keeping with the obligation of autonomy, we acknowledge that it is our combined strengths that will lift partnership to a higher level and that **neither party will seek to use its power to unfairly influence** the other to act against its future interests and those of the partnership. Our goal is to create a respectful win-win culture through freedom, transparency, and trust and we will work as equals in one team delivering workplace solutions to BP.
Honesty	We will strive to have **respectful**, **genuine**, and **sincere** conversations at all levels within the relationship. We encourage authenticity and empower everyone to share their opinion. We will look for the greater good and the value that can come from accepting all points of view.
Loyalty	We will strive to **value the other party's interests** to the same extent that we value our own interests. We will seek ways to make the relationship fair and balanced mutually.
Equity	We will strive to **reward** each party in **proportion** to the **value**, **risk**, or **investment** made into the relationship and its success. We acknowledge that we will face unpredictable situations. We will work within our governance structure to remedy any identified and agreed inequities.
Integrity	Integrity enables companies to **trust in each other's words and actions**. To achieve extraordinary results, our collective words and actions must be aligned with our joint vision and Guiding Principles. We commit to the highest ethical standards and do what is right for the greater good of the relationship.
Celebration	We will **celebrate**, **appreciate**, and **acknowledge** each other and recognize great work/achievements. We will create a space to support and celebrate the Wevo behaviors, achievements as well as individual's special milestones.

Source: Authors

Align expectations and interests

Once the parties laid a strong foundation for the partnership, they began developing the commercial aspects of the agreement, agreeing on the partnership's scope of work and economics.

A big step for the partnership was deciding to leverage the scale and expertise of both organizations to benefit the partnership. This meant rethinking the scope of the partnership—ultimately combining both real estate and facilities management under one umbrella and truly creating a global deal for the first time in BP's history of outsourcing workplace services. The scope was vast—spanning 47 sites across 18 countries throughout EMEA, America's, and APAC regions. Facility types ranged from BP's expansive corporate campuses and the sprawling Pangborn R&D facilities to strategic data centers. It even included a single one-story childcare facility in Houston.

This step included co-creating a win-win pricing model. Some of the key features of the pricing model are as follows:

- **Fully transparent "cost-is-the-cost" mantra.** Full transparency enabled the parties to identify the true cost drivers for both organizations and to create a model that incentivizes JLL to drive down cost and reward JLL for achieving non-cost-related desired outcomes such as helping BP achieve its zero-emissions goal.

- **Ensure cost savings are not prioritized over quality and safety.** The pricing model included "unlock" targets based on certain conditions; a safety lock meant that JLL must achieve a certain safety threshold to unlock other incentives.
- **Both monetary and non-monetary incentives.** Contract extensions, recognition/reference cases, and expanded scope as non-monetary incentives are included.

Stay aligned

As mentioned, staying aligned requires creating robust governance that holds the contracting parties accountable for living up to their intentions. Governance mechanisms include:

- a tiered management structure with a formal cadence;
- dedicated key personnel in key leadership roles with a defined process for the continuity of resources;
- peer-to-peer "two in a box" communications with an emphasis on problem-solving at the lowest levels;
- relationship management processes and formal relationship health monitoring processes;
- formal issue resolution management processes;
- formal processes for managing continuous improvement and innovation ideas; and
- formal contractual change management processes.

BP and JLL signed the wevo agreement in November 2021, with the entire process taking five months. The parties then set out to onboard team members with new ways of working.

BP's Erika Chiuhan and JLL's Chimene van de Rest found working under the relational contract refreshing. Chiuhan and Chimene assumed a two-in-a-box partnership role for managing continental Europe workplace services. Chiuhan explains what it means to be two-in-a-box partners: "To me, a two-in-a-box partner means there is an equal effort and an equal level of seniority and decision-making on both sides. So you have an informed client and a professional service partner looking at the same outcome." Chimene agrees: "It's a partnership, so I feel comfortable moving forward and in how we make decisions as we have the same goal and expectations. And we talk about it a lot, so we know what we can expect from each other."

The wevo team is now past transition and well into their transformation efforts. To date, wevo team members have partnered to deliver more than 100 projects in the first year. They are also breaking safety records—with the United States achieving zero recordable incidents. At the time of writing this case study, there have been more than 1,000 nominations for both individual and team acknowledgments.

Cuthbert challenges organizations to rethink their traditional approaches to outsourcing: "The traditional way of working with suppliers, I'd like to think has had its day now, and people will start seeing the real benefits of working alongside business partners in a mutually win-win relationship rather than it being one-sided."

Tips for starting the journey to relational contracting

Since rolling out the Vested methodology for formal relational contracts in 2010, relational contracting has been gaining traction. While BP and JLL are only in the second year of their relationship, dozens of other organizations have had ongoing success. For example, the University of Tennessee has 20 formal case studies from 36 organizations, with another 32 other organizations being open/public about their success.

As organizations shift to relational contracting, we recommend individuals who play a role in forming or managing business relationships and start writing contracts by reflecting on how relational contracting can improve the results for the organization. Here are four strategies organizations can start implementing in the journey toward relational contracting.

1. *Arm yourself with facts about transactional and relational contracts.* Investigate whether you suffer from problems in your transactional contracts and analyze whether the problems can be understood. Investigate your most successful commercial relationships and analyze whether success may result from using relational contracting elements.

2. *Involve the right stakeholders.* Upper management should become aware of the potential advantages and economic upside associated with relational contracting. Make them your allies and sponsors.

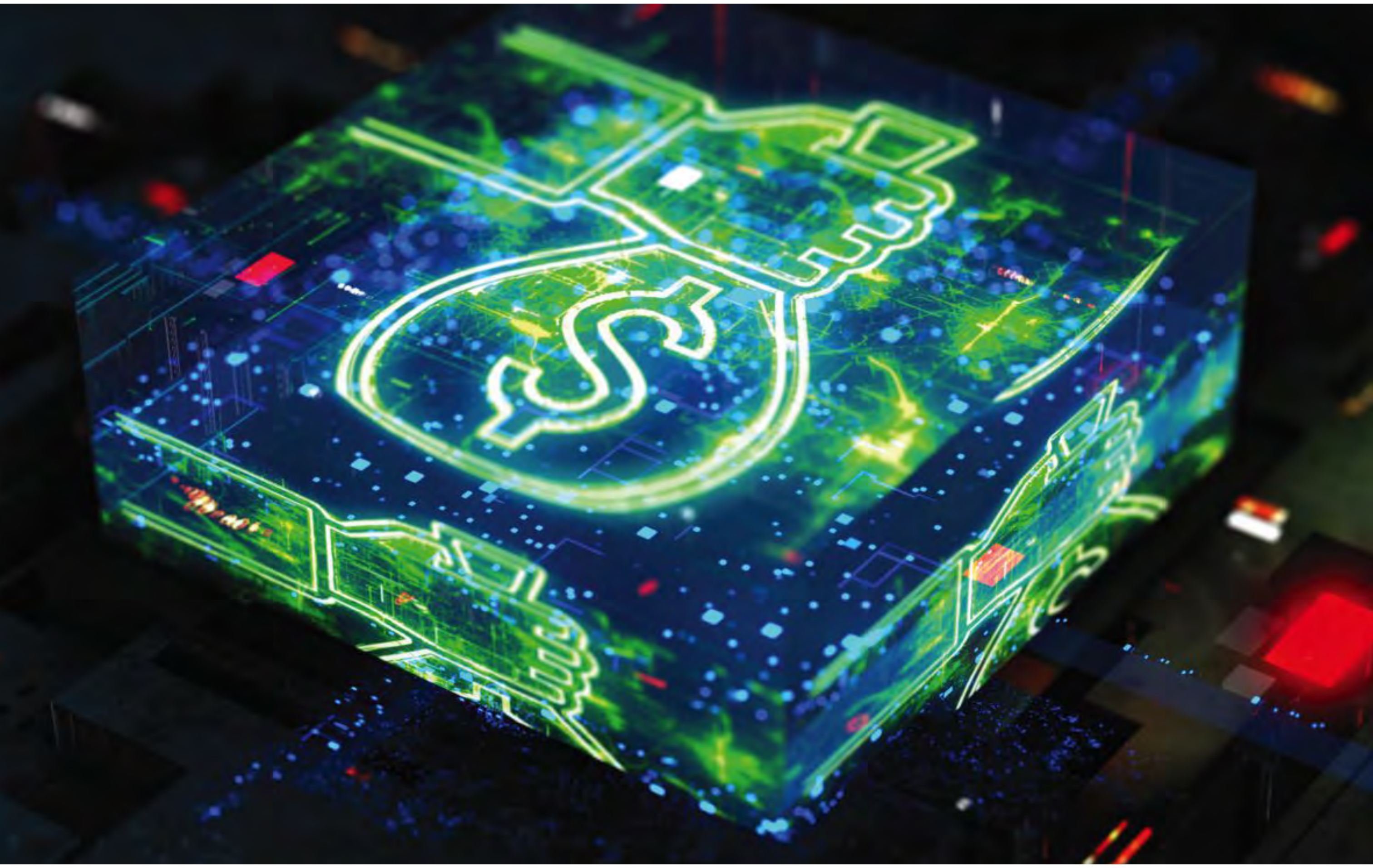
3. *Start with lower-risk contracts and call it a pilot.* That's a good way to de-risk and build a success story from which you can continue using relational contracting for bigger, more business-critical contracts.

4. *Be patient with naysayers and skeptics.* Relational contracting will probably meet resistance, regardless of the evidence of its advantages in many situations. However, hesitation should not be confused with bad intentions. Instead, try education as the change agent. The good news is that a growing body of research, writing and case law supports relational contracting.

The bottom line

The bottom line? It is your bottom line. Getting contracts right can create millions—if not billions—of dollars of value. But getting them wrong can cost millions of dollars when the parties become misaligned. Therefore, it is time to put past practices, beliefs, policies and contract templates aside and embrace contracting for the future in the new economy. This does not mean abandoning transactional contracts; rather, it means adding relational contracting to your toolkit when best fitting.

FINTECHS AND SME SUPPLIERS: LIQUIDITY THROUGH DIGITIZATION



Credit barriers and extended payment terms hamper the operational ability of tier 2 and tier 3 supply chain participants. But a new breed of technology companies are here to help.

BY WENTING LI, THOMAS Y. CHOI AND DALE S. ROGERS

The looming liquidity crisis is threatening small-and-medium-sized enterprises (SMEs). Across all supply chains, SMEs represent 90% of all enterprises worldwide, and they have been suffering. According to a 2020 study by the Organization for Economic Cooperation and Development (OECD), 20% of SMEs could run out of their cash reserve within one month. Their average bankruptcy rate could rise to 12.1% from 4.5% if there is no effective policy intervention. The *Wall Street Journal* reports that, in the United States, 25% of SMEs shut down in 2020. Despite governments issuing policies and special treatments to protect SMEs, their liquidity shortages remain unsolved.

A new breed of supply chain financing service providers called fintechs (i.e., financial technology companies) could offer potential solutions. They would digitize the assets (i.e., approved invoices, inventories, etc.) of SME suppliers and avail the related financial information to interested parties (i.e., focal companies, investors, etc.). We introduce in this article how fintechs can help the SMEs and their liquidity problems. We begin by categorically recounting the economic and supply chain conditions SMEs are operating under.

Problems SMEs face

SMEs lack funding from banks and their buying firms to meet their operational liquidity needs. There were $1.5 trillion to $2.6 trillion credit gaps in 2019, according to a report filed by Asian Development Bank (ADB). The World Trade Organization (WTO) estimated it could have been $1.9 trillion to $5.1 trillion in 2020. What are the sources of the credit gaps?

Credit barriers

It is difficult for SMEs to get financing from commercial banks. This is because SMEs

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generally lack collateral or reliable financial records. Even when they work with banks, they have to bear the burden of high loan rates and limited loan sizes.

Consequently, many SMEs turn to their internal funds and personal sources. A 2022 survey by The Business News Daily shows that one-half of small businesses, including startups, rely on loans from their families and friends. These personal sources do not require collateral, and SMEs can take flexible repayment plans and interest rates. However, this informal financing channel is unreliable, availability intermittent and limited.

Extended payment terms

Buying companies usually do not pay their suppliers immediately upon shipment. There are, in general, 30 to 120 days between delivery and cash collection. SME suppliers' bargaining position of payment terms is generally weak given their dependence on orders from their buying companies. Worse still, during the pandemic, many buyers decided to hold on to their cash by canceling orders and delaying payments even further. Consequently, many SME suppliers suffered liquidity shortages. According to a European Commission (EC) survey in 2022, more than 50% of payments have been delayed, even under the Late Payment Directive restricting late payments and requiring 30-day payments. More seriously, around 53% of SMEs lack the financial skills to cope with these late payment terms.

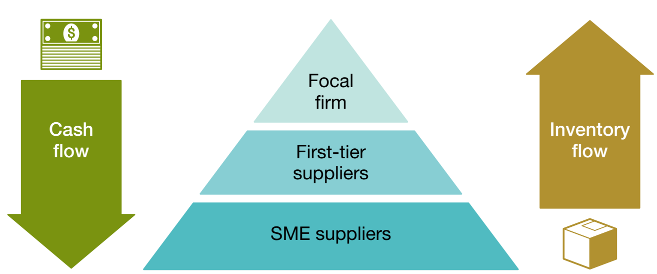
In the United States, according to a 2021 survey by Melio, 59% of SMEs experienced late payments, and 55% of them reported their customers delayed payments deliberately. Additionally, these SMEs claimed the late payment harmed their operations with 78% reporting the delayed payments as the cause of the decrease in revenues in 2020. In contrast, when buyers delay payments, they bear nearly no direct cost. According to Levelset, 70% of construction suppliers "rarely or never" charged interest for late payments.

Structure of the supply chain

How the supply chain is structured also works against SME suppliers. Figure 1 is a pictorial rendition of how companies are distributed in the supply chain. We have a few brand companies facing the consumer market. We call them "focal companies" or anchor companies because, structurally, they are at the apex of the supply chain. They tend to be large companies such as General Motors, Walmart, Dell, etc. and they enjoy lower cost of capital. These focal companies are served by large first-tier suppliers. Some of the first-tier suppliers are brand companies themselves (i.e., Proctor & Gamble, Intel, Delphi, etc.). While few first-tier suppliers are SMEs, the vast majority of the suppliers that lie further upstream are SMEs. In general, these SME suppliers account for smaller amounts of dollar spent for buying companies. Consequently, the buying companies, including the focal companies, tend to overlook the needs of SME suppliers. From their perspective, there are many SME suppliers, each of whom takes up relatively smaller spending, and it would be costly to care for their financial conditions. The focal companies' preference is to care for large suppliers that take up the larger percentage of their total spend and those

FIGURE 1

Distribution of company sizes, cash flow and inventory flow direction in supply chain



Source: Authors

that would be more difficult to replace.

In Figure 1, inventory flows toward the focal companies, but cash flow moves away from the focal companies in the opposite direction. The SME suppliers are structurally removed from the focal companies in the supply chain, and for this reason they are often called "deep-tier" suppliers. For these suppliers, it takes longer for the cash to flow to them from the focal companies. All other suppliers that operate between them and focal companies would try to look after their own financial needs first, often by extending the payment terms themselves. Therefore, these deep-tier SME suppliers often get the brunt end of the stick—they are first to be squeezed out when there is any liquidity shortage in the supply chain.

Being left out

Naturally, focal companies end up caring more for the financial health of the large first-tier suppliers and less about the SME suppliers further upstream in the supply chain. Focal companies collaborate with banks to provide supply chain financing (SCF) to their first-tier suppliers to get liquidity, but such provisions usually are not extended to the SME suppliers.

Specifically, bank-led SCF, such as reverse factoring, helps suppliers get advanced payment by selling their accounts receivable (i.e., approved invoices) to banks. However, bank-led SCF primarily benefits large first-tier suppliers due to the credit barrier SMEs face. Banks are highly regulated and need to follow compliance regulations such as Know Your Customer (KYC) and Anti-money Laundering (AML) to identify and monitor the financial behaviors of their customers. Therefore, they are generally unwilling to provide SCF programs to SME suppliers due to the high cost of implementing KYC and AML requirements. For those SMEs operating further upstream in the supply chain, their accounts receivables are from other suppliers. Lacking direct connection to the focal companies, they are left out of the SCF programs that focal companies offer their first-tier suppliers.

Financial regulations and geopolitics

Basel Accords are global banking regulations for credit risk management to prevent unexpected crises. The new standard of Basel Capital Accords (Basel IV) was deferred by COVID-19 but is in the process of being implemented. Basel IV implementation will negatively affect SME financing according to the evaluation of the Financial Stability Board. This new regulation policy continues to enhance the monitoring of the banking industry and tighten risk management, which means banks will require more collateral from companies under this stricter liquidity regulation. It will be harder for SME suppliers to get bank financing.

In addition, trade conflicts between superpowers such as the United States and China increase SME's operating costs and would further squeeze their cash flow. In a 2019 survey by BizBuySell as reported by CNBC, 43% of SME owners acknowledged their operating costs would increase by 25% because of the tariffs in the U.S.-China trade war. According to a UK national survey, a quarter of SMEs are impacted by Brexit because of increased operating costs and transaction costs. Moreover, the Russia-Ukraine conflict has contributed to inflation, rising energy prices, and shipping disruptions, significantly worsening SMEs' liquidity crunch.

All these threats bring liquidity uncertainty to the global supply chain and exacerbate SMEs' liquidity shortages. The liquidity crunch in the supply chain could lead to inventory shortages and bankruptcy for SME suppliers, which would further provoke supply chain disruptions. Therefore, SMEs are in dire need to find additional ways to get liquidity.

Fintechs and digitizing supply chain assets

Fintechs are financial technology companies that act as intermediaries in facilitating transactions between buyers and suppliers. There are many fintechs globally that facilitate purchases, including PrimeRevenue, C2FO, SkuChain, Centrifuge, and Ariba. There are new operations launched by commercial banks (Citi Group, HSBC, etc.) and third-party logistic firms (i.e., CloudTrucks, RoadSync, etc.).

In the supply chain, fintechs are designed to provide liquidity to suppliers based on transactions with the buying firm. They help both the buyer and supplier to improve working capital—the buyers can extend payment terms and the suppliers can get accelerated payments. According to an online article in *Harvard Business Review* by Rogers, Leuschner, and Choi, fintech is a new breed of financial service companies that can benefit the supply chain with greater liquidity and less variability by facilitating payments.

In essence, fintechs are financial intermediaries that use information technology to overcome the information asymmetry of credit barriers and structural barriers of SME suppliers in the supply chain. They apply innovative information technology, such as e-platform, distributed ledger technology (DLT), artificial intelligence (AI), smart contracts, and cloud computing.

A new source of liquidity

According to the EY Global FinTech Adoption Index 2019, around 70% of fintech adopters lack expertise in managing their working capital management. Fintechs could help SMEs manage financial risks and market downtimes through cash flow forecasting and liquidity support.

Fintechs can provide a way for SME suppliers to connect to focal firms and financial institutions through decentralized connectivity by using DLT. In essence, they help to decrease SME suppliers' structural distance to the focal firms and the credit barriers to banks by improving visibility. Besides DLT, there are other ways to visualize SME suppliers' supply chain assets. For example, some risk management platforms such as Resilinc map supply chains and provide deep supply chain visibility for better risk management.

Through fintechs, focal firms and financial institutions could access SME suppliers' assets information, including accounts receivable, inventory flow, and operations data. That means focal firms can, with the help of fintechs, offer SME suppliers, including deep-tier suppliers, innovative invoice financing, inventory financing, and data-driven financing services based on their supply chain assets. However, to leverage this new financing channel, SMEs need to understand better how their supply chain assets can be reframed by fintechs.

Strengthening current assets

Current assets, such as approved invoices and inventory, can be leveraged to secure financing and provide a steady source of liquidity. By properly adopting and utilizing fintechs, deep-tier SME suppliers could get liquidity based on their approved invoices and inventory. With the help of fintechs, SMEs' purchase orders (PO), even including past transaction records, could be used as their credit source. Fintechs help strengthen current assets in the supply chain by applying innovative ways to characterize them. The new traits through which current assets are characterized are: tokenizable, tradable, traceable, fragmentable and predictable.

Tokenizable. Tokenization enables SMEs' invoices and inventory to be digitized and can be shown as digital assets in blockchain by leveraging DLT. It represents a process of transforming assets in real life and produces digital tokens on a blockchain platform. Tokenization holds much promise, but it is still in the early stage of development. The tokenizable trait of SMEs' assets allow SME suppliers to make their asset information accessible to financial institutions and focal firms.

Tradable. Based on the tokenized assets, the SME suppliers' accounts receivables could be traded by buying companies in the supply chain, connected to the fintech platform. In addition, the focal firm's accounts payable, in the form of commercial drafts, could be traded and transferred along the supply chain to deep-tier suppliers on the fintech platform.

Traceable. Once SME suppliers' assets are tokenized, all the movements and transactional activities of the supply chain assets are traced and validated by the DLT consensus mechanism (i.e., through proof-of-work) on the fintech platforms. Each transaction has a unique digital signature and is open to all participants (supplier, buyer and financial institutions). This trait improves the transparency and security of the financing process.

Fragmentable. Because tokenized assets are in a digitized form, they can be easily broken up into smaller pieces. Depending on demand, partial trading is possible. SME suppliers can choose to sell the partial value of their invoices to financial institutions. This trait offers flexibility for SMEs and their financial planning. SME suppliers may sell parts of their accounts receivable according to the demand of their working capital, and they may keep the remaining accounts receivable until the rest of the payment is due, preventing loss from discounting the remaining part.

Predictable. Fintechs use AI and big data technology to predict SMEs' future cash flow based on SMEs' historical financial data and operations data. This trait benefits SMEs in two ways. One: cash flow forecasting helps SMEs manage their working capital and payment activities better and prevent liquidity risk in advance. Two: SMEs can get credit financing through fintech's analysis of their financial data in the bank account and trading data on the e-platform. This credit financing will control the loan risk based on SMEs' actual historical financial and operational data.

Emerging solutions offered through fintechs

We discuss four types of solutions fitechs offer. These solutions are still early on their development curve and require caution when being considered.

Dynamic discounting

Dynamic discounting allows SMEs to get an advanced payment using their approved invoices. The dynamic discounting could be initiated by a buyer or supplier. For buyer-initiated dynamic discounting, the buyer may offer a threshold discount rate and the suppliers would respond by bidding on the rates they are willing to offer. In contrast, in the supplier-initiated dynamic discounting, a supplier sets the discount rate for the buyer's advanced payment, and then the buyer and supplier can negotiate the final deal. One advantage the suppliers get from this process is the ability to choose the timing of the payment from the focal firm. Dynamic discounting has largely been applied to the suppliers working directly with the focal company in the past (i.e., first-tier SME suppliers), but with the tokenizable, tradable, and fragmentable traits of invoices as supplier assets, dynamic discounting is being offered to deep-tier SME suppliers operating further upstream in the supply chain.

Dynamic discounting for first-tier SME suppliers. Fintechs may provide a dynamic discounting platform to a focal firm's first-tier suppliers for early payments. A focal firm would contract with a fintech to offer this service to their first-tier SME suppliers. Once the supplier's invoice is approved by the buyer, the supplier has the option of participating in dynamic discounting for early payment. The buyer sets multiple discount rates on the platform based on the timing of the payment. Suppliers can select the discounted early payment any time before the payment due date. Because many SME suppliers still operate on paper-based invoices, some fintechs offer digitization of these invoices. For instance, a fintech called iPayables utilizes optical character recognition (OCR) technology to process e-invoices transferred from paper-based invoices automatically.

Dynamic discounting for deep-tier SME suppliers. For those SME suppliers operating further away from the focal company (i.e., deep-tier SMEs), a dynamic discounting e-platform can be used to connect them to focal firms. It is done by tokenizing the focal firm's commercial drafts, which act as the payment commitment proof. The commercial drafts are issued by the focal firms based on their accounts payable to the first-tier suppliers. Then, the first-tier suppliers could make payments to their suppliers (i.e., second-tier suppliers) using these tokenized commercial drafts. Then, the second-tier suppliers do the same thing and pay their suppliers in the third tier. Therefore, deep-tier SMEs could get paid against their accounts receivables through these tokenized commercial drafts passed by other suppliers downstream in the supply chain. Deep-tier SME suppliers could get advanced payment with a discount rate by selling commercial drafts to banks collaborating with focal firms.

Non-fungible tokens

Non-fungible tokens (NFT) are a digital asset verifying ownership based on blockchain technology. In our case, the digital asset is the approved invoices held by a supplier. A fintech may provide a platform that uses DLT to digitize approved invoices. The outcome of this digitization is NFT. The advantage of NFT is that once all suppliers across a supply chain participate, they are all connected to the focal firm and these connections are digitally visible. Further, all their buyer-supplier transactions are facilitated through smart contracts in blockchain. What that means is that all participating suppliers up and down the supply chain may take advantage of the focal firm's low cost of capital. The supply chain financing tool that facilitates early payments to the suppliers using the focal firm's low cost of capital is reverse factoring. As such, invoices as NFT would enable deep-tier SMEs to participate in reverse factoring provided by the focal firm. Further, once digitized into NFT, they can also get funding from cryptocurrency marketplaces.

NFT-enabled reverse factoring. Deep-tier SME suppliers could obtain liquidity by selling their NFT invoices to the third-party funders (i.e., banks). These funders can see who is the focal firm tied to this NFT invoice and its cost of capital. In other words, deep-tier SMEs can sell their NFT invoices at a lower cost with focal firms as counterparties, even though there may be no direct transaction contract between a particular SME supplier and the focal firm. This is because smart contracts, based on DLT, connect deep-tier SME suppliers' accounts receivables to the focal firm's future payments. In this regard, fintechs (i.e., Tradeshift, Centrifuge, etc.) help SME suppliers create NFT invoices using the focal firm's future payments as a collateral. Once that is done, the third-party funders can issue funds to SMEs based on that collateral that connects SMEs to the focal firm. Ultimately, through NFT invoice and smart contracts, deep-tier SMEs could take lower-cost financing by the creditworthiness of the large focal firm.

NFT-enabled De-Fi financing. SME suppliers could obtain liquidity by selling their NFT invoices to the cryptocurrency marketplace. This is done based on the tokenizable and tradable traits of NFT invoices. There are fintechs (i.e., Centrifuge, Ripple, etc.) that offer a decentralized financial (De-Fi) marketplace. SMEs worldwide could get financing against their NFT invoices in these De-Fi marketplaces. A De-Fi marketplace enables individuals to trade their assets and clear the transaction without the involvement of a central authority (i.e., banks). NFTs can be traded by the investors in the cryptocurrency marketplace. For example, Dai is a blockchain-based cryptocurrency used by Centrifuge. When trading in this fintech's De-Fi marketplace, NFTs are traded using Dai. Dai is considered a stablecoin with a fixed exchange rate tied to a legal currency. SMEs can get financing in any of their preferred currency converted from Dai.

Some fintechs may offer SME suppliers access to global financial networks. For example, a fintech called Ripple offers a network of global investors a DLT-based platform where SME suppliers can list their assets. In other words, SMEs can get liquidity through Ripple's platform from investors coming from anywhere in the world. Specifically, Ripple is based on a blockchain called XRP Ledger, a digital assets community on a public blockchain as opposed to a private blockchain. This means anyone can access the financial network provided in Ripple's platform. Any SME supplier with an approved invoice could tokenize it in Ripple's XRP Ledger and get financing from global investors in any currency they prefer.

Inventory tokenization

Inventories have financial value even before they are delivered, if they are produced as part of the focal firm's bill of materials. In this context, deep-tier SME suppliers can get pre-payment from financial institutions by tokenizing their inventory before it is delivered. Once tokenized, the inventory information can be monitored by the fintechs and shared with the investors.

Monitoring by fintechs. Given the traceable traits, a fintech is informed that a specific batch of deep-tier suppliers' inventory has been tokenized. The fintech would also know how this batch of inventory is connected to the focal firm's bill of materials. It would know by the shared information about the purchase order that has been issued by the focal firm to its first-tier supplier that handles the specific portion of the bill of materials containing the batch of inventory from this particular deep-tier supplier. By leveraging the tokenized inventory that is traceable, fintechs could monitor the real-time status of the inventory from deep-tier SME suppliers so that they can make sure the inventory is safe and processed across the supply chain as planned. The third-party funder (i.e., an investor) may fund deep-tier SMEs based on this in-process inventory and focal firms' payment commitment to the inventory.

Monitoring by focal firms. Focal firms would also have visibility into their supply chains in regards to the movement of inventories on their bill of materials. Skuchain is a fintech that offers inventory financing to deep-tier SME suppliers by tokenizing their inventory using DLT. With its services, it also enables focal firms to track the inventory status across the supply chain. Through its platform, Skuchain tracks inventory movements and transaction activities and makes them visible to focal firms and investors. Through such DLT-based inventory financing, deep-tier SME suppliers get advanced payments using their inventory and the focal firms get visibility.

Cash flow prediction

One notable feature in the platforms offered by fintechs is the ability to do cash flow prediction. SME suppliers would need to input their operations data, and the predictable trait through big data and AI may help SME suppliers maximize their cash flow and get liquidity. Cash flow prediction would help SMEs get liquidity based on their future cash inflow.

Cash flow management. Lacking financial skills, SME suppliers typically operate payment to payment and have difficulty managing their working capital. In this regard, cash is the lifeblood of SME suppliers. Fintechs can help SME suppliers bring more discipline in their cash flow management. For example, a fintech called Tesorio uses open application programming interface (API) to aggregate cash flow data from disparate systems. Using the aggregated data, Terosio's AI algorithm can do cash flow forecasting which SME suppliers can take advantage. It can predict an SME supplier's cash inflow and outflow and offer advice on financial decisions. In other words, the AI algorithm serves as an intelligent assistant in working capital management by providing SMEs with real-time decision consultation on accounts payables and receivables to prevent insolvency risk in advance.

Credit financing. The AI forecasting of cash flow can facilitate short-term loans for SME suppliers. An interested SME supplier may apply online on a fintech platform by providing their financial information. The AI algorithm would evaluate the application and can help the fintech estimate a loan limit for this SME supplier. If the SME supplier accepts the loan limit, the fintech and supplier would discuss the repayment schedule. Once that is complete, the SME supplier officially takes the offer by signing the payments contract and gets the cash on a specified day. Fintechs will collect the repayments after future revenue is realized. The fintechs that offer this type of services are a UK-based firm called Previse and a U.S.-based firm called Fundbox. They also provide a free cash flow management platform to help SMEs make smart financial decisions.

Another type of past information that can be used in credit financing is an SME's past e-commerce activities. Using an SME supplier's digital footprint in the e-commerce platform, a fintech can help the supplier get a short-term loan. Suppose an SME supplier manages its customers and associated transactions on a fintech platform. Then, this fintech estimates the supplier's future cash flow based on its transaction history with its customers and evaluates its credit scores. The supplier gets its pre-qualified credit scores on the platform and obtains the loan. SAP Ariba, a business network management platform, provides suppliers with a client management platform to manage their sales network and transactions with customers. SAP Ariba grants SMEs a credit score based on their transaction data and business network. In this way, a supplier can apply for credit financing based on its credit score without the involvement of its buyers.

Concluding remarks

We present liquidity problems unique to SMEs. We describe the credit barrier and extended payment terms that they face. Generally, operating more on the upstream side of the supply chain and their size being smaller with fewer resources, they are often left out of the SCF programs offered by large focal firms. Financial regulations and geopolitics add to the uncertainty that SMEs are grappling with.

We introduce the role of fintechs in this regard and how they could provide SMEs with more options to obtain liquidity. The current shift toward digitizing supply chain assets enables fintechs to help connect SME suppliers with the focal firms and financial institutions that are used to working with large first-tier suppliers. Based on the new traits of supply chain assets, we pose four emerging solutions for SME suppliers' liquidity problems.

We believe supply chain digitization will grow, with that, the assets SMEs hold can become known to the focal firms and financial institutions. We anticipate fintechs will begin to play a growing role in this regard. We hope, in coming years, SMEs will be able to take advantage of the SCF options that become available to them and find more stability in their financial planning.

PETROBRAS SCORS WITH TRANSFORMATION

To streamline its maintenance parts inventory, the Brazilian oil and gas giant launched a transformation project utilizing SCOR. The result: The avoidance of $786 million in inventory purchases in only 18 months.

BY BOB TREBILCOCK

Bob Trebilcock, editorial advisor, Supply Chain Management Review

Managing spare parts inventory is a balancing act. In asset-heavy industries, uptime is essential to profitable operations. That's true whether you're operating a manufacturing line, mining equipment or an oil and gas drilling rig and refinery. Given the choice between too little and too much inventory, many organizations opt for lots of just-in-case parts and materials on the shelf. The view is that the investment in extra inventory is less than the cost of shutting down operations for the lack of a part.

There are other common complicating factors that are familiar to almost anyone responsible for MRO inventory. For one, buying authority is often decentralized across individuals or teams such as the engineering team, the team responsible for scheduling maintenance and new construction projects, or the procurement and/or inventory management team; one hand doesn't always know what the other hand is buying. For another, overstocks may end up in the landfill if they exceed their expiration date or become obsolete as older equipment is phased out, overhauled or replaced. That's not just costly, but it has an impact on sustainability for organizations focusing on ESG.

Those were some of the conditions that confronted Petrobras in 2019. "At that time, we had two problems," recalls Paulo Henrique Furtado, the inventory manager at the Brazilian energy company. "We had high inventory levels and high levels of surplus inventory. At the same time, we had low customer satisfaction levels because the people within our organization who used spare parts and materials couldn't always get them when they needed them.

The combination of low customer satisfaction levels and high inventory levels caught the attention of the board of directors. That year, the board directed the supply chain team to seek a benchmark to measure, and then improve, Petrobras' supply chain performance. In response, one of the world's largest oil and gas companies launched a transformation project that even today continues to improve its customer service levels and create new inventory management practices that could impact the bottom line. To make that happen, the supply chain organization utilized the Association for Supply Chain Management's Supply Chain Operations Reference model, or SCOR.

Among the results to date: A 25% reduction in the inventory days of supply from 2019 to 2021; a 40% reduction in active SKU codes; and the avoidance of nearly $800 million in unnecessary inventory purchases. In addition, Petrobras is using transformation to upskill the supply chain team by mapping requirements for each supply chain function, measure the skills gap of each employee, and then create an action plan with specific trainings to fill those gaps. A pilot program in the inventory management department delivered a 32% skills improvement among team members.

Yet transformation is not once and done. Four years later, Petrobras is still on its journey toward a world-class supply chain, with a continued focus on improving the service it delivers to the internal customers who rely on spare parts for their projects.

This is how they did it.

Assessing the supply chain

Petrobras knew that a number of factors had contributed to high levels of inventory. One was just the nature of the oil and gas industry: It is highly-regulated, including regulations related to the production of repair parts and materials, which often leads to long and unreliable lead times from suppliers; the production environment is complex; and there are a million SKUs and thousands of suppliers to track and manage. Unpredictability is the norm.

Another was that the teams that use spare parts and materials and the procurement team tasked with acquiring them often worked in silos. The operations teams weren't always aware of what inventory might be in stock when they placed requisitions. Meanwhile, the inventory management team's role was primarily to place orders created by operations. "At the time, we were more of an attending function: We couldn't say no, you don't need this, and we didn't believe that we had the power to influence the process," Furtado recalls. "We had a huge amount of requisitions that we needed to attend to, and we weren't able to prioritize what was important because everything was important."

In the spring of 2019, Petrobras reached out to ASCM. At the time, the conversation "quickly turned to the Enterprise Certification for Sustainability standard," recalls Douglas Kent. Today, Kent is ASCM's executive vice president for corporate and strategic alliances, but in 2019, he was a supply chain consultant whose role was to run ASCM transformation projects. "Our first conversations centered on the breadth and depth of the standards and the process they had to go through to get certified," Kent recalls. While there were supply chain specific standards, the sustainability certification addresses the triple bottom line, including corporate governance and ethics.

Sustainability may seem like an odd jumping off point for an organization with an inventory management problem. To Petrobras, there were logical connections. As an energy company, sustainable operations were increasingly an important strategic focus. "We have been working on sustainability since the early 2000s and are very aware of our environmental impact," Furtado says. "We emphasize a culture of safety and environmental care. So, when we learned that ASCM was developing a sustainability certification process, that was a good starting point to look at our supply chain."

For another, excess inventory often creates waste that a sustainable operation wants to avoid. Reducing waste by getting control of MRO inventory levels was a potential piece of Petrobras' sustainability strategy. "One of the things we discovered during our work with ASCM was that if we have the right inventory, we won't end up with so much scrap or have to take as much material to the landfill." Petrobras agreed to pilot the new sustainability standard in its MRO and Investment Materials Supply Chain.

To get started, Kent and an ASCM assessment team ran what is known as "a maturity assessment against the Enterprise Certification standards." For that process, ASCM conducted interviews and analyzed reams of data about Petrobras's operations. Furtado recalls that it included an evaluation of 170 documents and procedures, as well as trips and meetings with other organizations.

At the end of the assessment, some key Process Excellence criteria received a low maturity score against the standard, such as S&OP optimization. "We always knew that we had a problem, but now we had results that we could show our board, our internal users and everyone associated with the process in a clear way that we had an unbalanced supply chain, and that we were buying more than we could consume," Furtado says.

A second finding was the need to create specific policies for specific parts categories rather than generic policies for more than 1 million SKUs from thousands of suppliers. "Before, we treated every category of parts the same way," Furtado notes.

Following the assessment, Petrobras became the first ASCM-certified company for sustainability in the world. The assessment findings also set the stage for the transformation and learning program (TLP) that came next.

To develop a world-class supply chain, Petrobras identified four specific objectives for the TLP initiative.

- balance the demand for materials with execution, contracting and logistics capabilities;
- implement an integrated business planning process with the team's assertiveness in planning

materials for routine maintenance, turnarounds and investment projects;

- create and compare planning and allocation scenarios, enabling continuous assessment of transformation efforts; and
- establish monthly planning meetings with business, supply and logistics areas.

The transformation team also identified a total of six projects they could undertake. An important realization was that they couldn't boil the ocean: This wouldn't happen overnight.

Upskilling

The skills and competencies section of the assessment identified areas for improvement of employee skills especially in supply chain processes and systems. As such, a starting point for the transformation was to train a special team in SCOR methodology and familiarize them with new tools and market best practices. The SCOR training ensures that trained employees are speaking a common language and utilizing the same tools and best practices, which is essential to getting the team aligned around common goals.

A total of 19 team members earned the SCOR-P endorsement. In addition, Petrobras's data was then submitted to SCORmark, ASCM's benchmarking program facilitated by PwC. PwC compares the submitted data against historical population data from more than 1,500 organizations and 2,500 supply chains to identify gaps and make improvements. "That confirmed the previous diagnosis that we had lower-than-expected performance," Furtado recalls.

The combination of recommendations from the assessment, a new team with 19 trained members who earned their SCOR-P endorsement and confirmation of deficiencies created the foundation for the next steps.

Getting started with TLP

Two over-arching goals governed the TLP: Reduce the cost of inventory and improve the customer service level to the inventory team's clients—Petrobras operations such as drilling platforms and refineries that rely on MRO parts.

To reach those goals, Furtado says, Petrobras realized it had to break down and integrate silos throughout the organization. The most obvious example of an organizational silo was the fact that the people who used parts and materials requisitioned their inventory without input from the team responsible for managing and procuring the inventory. They were both in their own separate kingdoms. With that in mind, six cross-functional teams were created to develop a structure and then work on the six projects. "We brought in people from warehousing, purchasing and inventory management in our supply chain management group and we brought in others from operational units like exploration, production, investment and our refineries," Furtado says.

The teams began to meet once a month starting in December 2019. Then in February 2020, COVID halted TLP progress. Meetings resumed in June 2020, with six teams meeting two times a week on Microsoft Teams from June to August. There were group meetings, individual team meetings and follow-on meetings with ASCM focused on finalizing the proposals for each project. Petrobras teams also met with other companies in Brazil that used a lot of MRO inventory, like mining companies, to learn how they were addressing these issues. During this time, they also continued to upskill more team members, who earned ASCM certifications and participated in some of the newer offerings like digital capabilities.

By August 2020, the teams presented the structure and objectives for their projects to the board. While a structure was in place for all the projects, "we realized that six was too many given the capacity constraints we had to deal with during COVID," Furtado recalls. To get back on track, Petrobras prioritized the three projects that would best fill in the gaps identified by ASCM during the diagnosis phase and deliver the most short-term impact to the organization: integrated business planning, the development of rigorous inventory management practices, and workforce development and continued upskilling.

Three projects

As the work began, Furtado says they quickly realized that the status quo, or culture, would need to change for the transformation to succeed, and that change would not happen

Petrobras at a glance

Headquarters: Rio de Janeiro, Brazil

Revenue: US$124.474 billion

Fortune 500 Ranking: 128

Employees: 45,532

Production Platforms: 57

Refineries: 12

Owned and chartered vessels: 123

Rigs: 20

Production: Oil, NGL and Natural Gas: 2.757 million barrels per day

Oil products production:1.726 million barrels per day

From SCOR to digital SCOR

Petrobras utilized the SCOR model for its transformation. But, just as Petrobras was in the process of an enterprise transformation, so is the SCOR model.

At its 2022 conference, the Association for Supply Chain Management introduced the SCOR Digital Standard. Like the original SCOR, the standard allows an organization to benchmark its digital capabilities against the model, identify gaps and then develop a plan to close the gaps. According to Peter Bolstorff, ASCM's executive vice president for innovation and business intelligence, the updates were a recognition by the board that the original SCOR model was developed before the age of the digital supply chain. A board-directed task force was formed in 2018 to address the issue.

The first step was the development in collaboration with Deloitte of the initial version of the DSN Capability Model (DSN refers to a digital supply network). "DSN recognized that supply chains are no longer defined by a linear set of actions from plan to source to make to deliver, but rather by a set of digital supply networks," Bolstorff says. "It includes a digital capabilities model that was designed to be a central component of a digital transformation as a company evaluates and builds its digitally enabled capabilities." The DSN Capability Model was introduced in September 2019.

For the second step, SCOR was updated so that the different sections were in one voice and were offered online in a digital format—a part of ASCM's own digital transformation. "Historically, we had different teams work on the different supply chain processes," Bolstorff says. "For this update, plan, source, make, deliver and return worked together and then we put it online along with DSN." Essentially, they broke down and integrate siloed processes.

The third step, introduced at the 2022 conference, was to launch the SCOR Digital Standard as an open standard rather than one that was only available to ASCM members. Bolstorff adds that a team of 70 is in the process of revising SCOR for 2030.

WHAT'S DIFFERENT AND IMPORTANT?

Bidirectional not linear. The new model recognizes that today's supply chain no longer moves in one direction from plan to deliver, but is circular. To that end, the model is designed to synchronize "a regenerative supply chain," Bolstorff says.

Improved source. The sourcing component was overhauled to reflect today's procurement function.

Changes to transportation. The deliver function was broken out as a separate component to reflect the realities of last-mile delivery in omni-channel. Transportation planning to address the first and middle miles has been added as a feature.

Orchestrate. This component introduces supply chain strategy and circular supply chain management.

While the SCOR tool is nearly 30 years old, Bolstorff says that it is still relevant to organizations like Petrobras intent on transforming their supply chains. "SCOR provides common definitions and a common language across all tiers in a supply chain," he says. "That's important if you're going to move things forward, and to respond to disruptions in a coordinated fashion."

The other is that for companies without the resources of a Fortune 100 company to bring in a consultancy, SCOR provides a model, tools and perhaps a coach to enable an organization like Petrobras to do its own self-assessment and develop a plan to address gaps. "There is still a cost associated with SCOR, but companies that go through a SCOR transformation can then continue on their own and perhaps benefit their smaller suppliers that can't do it themselves."

overnight. "But we also knew that we had important problems to address that required immediate actions," he says. In response, they developed a two-part solution: One was a short-term strategy that could be implemented and begin to drive change without upsetting the apple cart; the other designed to drive medium- and long-term changes, including cultural changes.

As part of the integrated business planning project, for instance, team members from inventory management, procurement and the business units developed an algorithm called purchase limit that monitors the use of maintenance materials and analyzes all purchase orders and purchase requisitions against relevant criteria like the expected date of consumption, supply lead times and inventory on hand. By analyzing inventory flows, the team began to learn where they could stop unnecessary requisitions and only purchase materials that are really needed. The purchase limit tool has largely been responsible for the avoidance of almost $800 million in purchases identified at the outset.

For the medium term, Petrobras created a dedicated team to implement sales, inventory and operations planning modifications for MRO. "We created a step-by-step schedule to implement SI&OP business unit by business unit," Furtado says. "We have completed the first implementation, and we're already seeing an improved planning process, with an enhanced focus on purchasing, healthier cash flow and a reduction in the volume of material being purchased in that unit."

Rather than treat all inventory the same, the inventory management team took actions to create specific inventory policies for strategic categories and to improve master data management practices. "By implementing these actions we reduced our inventory days of supply by 25% between 2019 and 2021 and saw a 40% reduction in active SKU codes," Furtado says.

In workforce development, the TLP team designed a new process to close the skills gap. The process mapped the requirements for each supply chain function and then mapped the gaps for each employee in that function. To fill the gaps, they created an action plan to get employees the specific training they were missing. "We ran a pilot in the inventory management department, and realized a 32% skill improvement," Furtado says. "So, now we are running this process across the supply chain functions."

Change is hard

Petrobras is in the fourth year of its transformation. The results to date are delivering real operational and financial results. However, Furtado says there is more to be done in the long term to drive continual improvement. He also acknowledges that change is hard. What then are the keys to transformation success?

Sponsorship is crucial. Furtado notes that a board mandate was essential to the progress at Petrobras. "Transformation demands executive sponsorship," he says. "Some decisions could only be made at the board level, and sometimes we needed to use a hammer to make things happen."

People matter. Furtado believes that the ongoing upskilling process is enabling the transformation at Petrobras. "As a consequence of their training, our employees started to bring new ideas and new solutions that were crucial for what we have accomplished," he says.

Don't forget empathy. Today's supply chains are so data driven that it's easy to forget that those people managing the supply chains have their own views and feelings about what is going on. "The transformation needed to touch all points of the company," Furtado says. "So, we had to consider the reality, difficulties and peculiarities of everyone inside the process if we were going to develop actions together." Bringing empathy to the table helped employees better understand the transformation, and for managers to better understand their employees.

Still, good data counts. "A data-driven culture is a must," Furtado says. "By gathering data about our processes, we could see changes and take further actions."

Take ownership. One of the laws of physics is that for every action, there is an equal and opposite reaction. "One of our learnings was that every action must have an owner," Furtado says. When ownership wasn't clear, the opposite reaction prevailed, and the action failed.

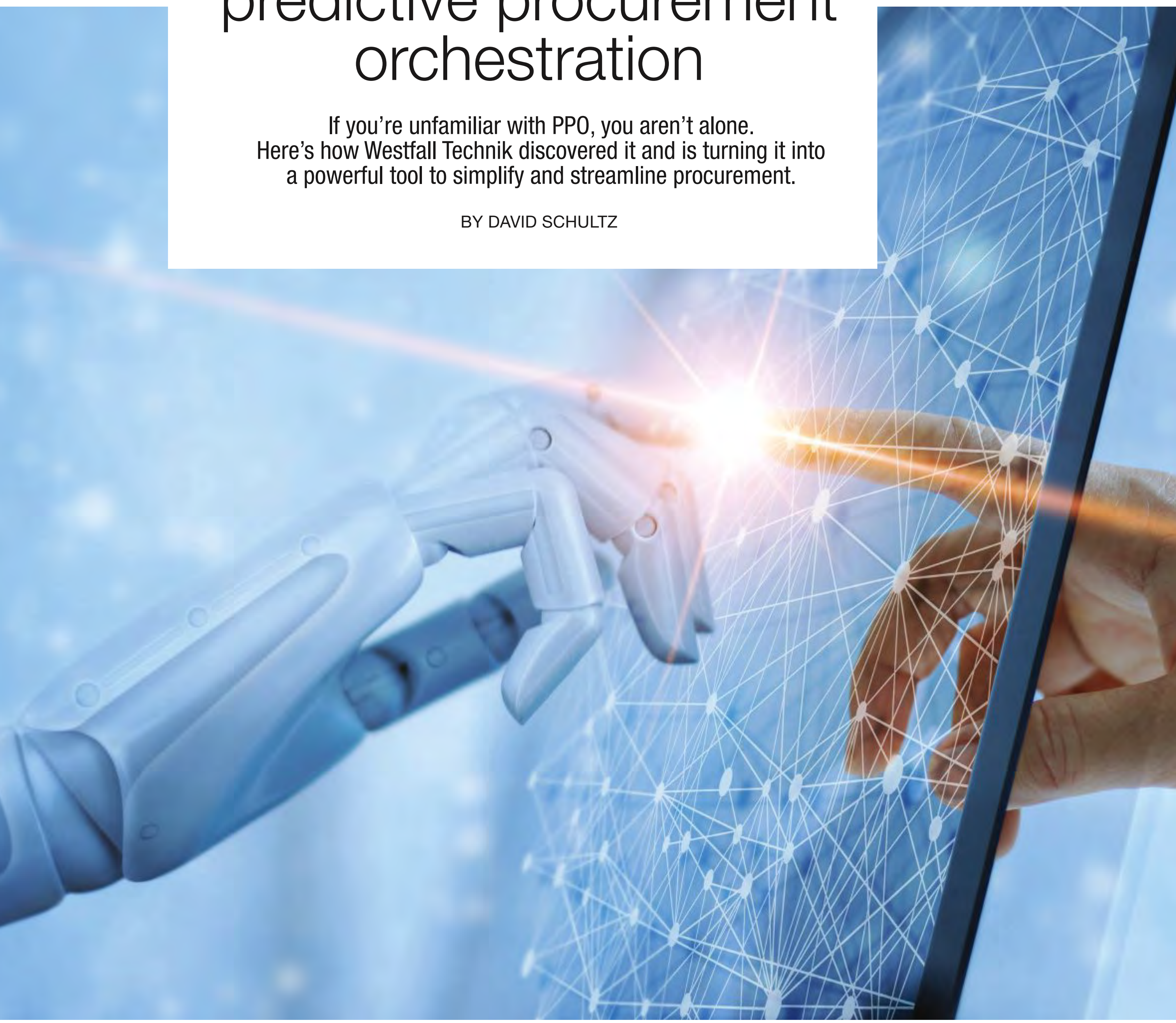
Transformation at Petrobras continues. Customer satisfaction levels can still be improved. And, in the process of earning the Enterprise Certification for Sustainability, Petrobras discovered opportunities to improve the company's ESG metrics around social responsibility.

"After that, we will run a new ASCM assessment, and start the cycle over again," Furtado says.

A running start at predictive procurement orchestration

If you're unfamiliar with PPO, you aren't alone. Here's how Westfall Technik discovered it and is turning it into a powerful tool to simplify and streamline procurement.

BY DAVID SCHULTZ



David Schultz is the chief supply chain officer of Westfall Technik

This is a story of what-ifs. Here are 10 to get started.

What if the procurement process could be more: Disciplined. Predictive. Productive. Data dependent. Strategic.

What if the procurement process could be less: Reactive. Time consuming. Costly. Isolated. Uncertain.

That's a lot of what-ifs, each with the potential for a strong ripple effect across a business. And at Westfall Technik, those what-ifs are powerful outcomes that today are driven by predictive procurement orchestration (PPO). And even though we are still in the early stages of implementing PPO, we know it is the preferred platform for a highly effective and efficient procurement process at Westfall.

But first, a little background. The company is a $350 million roll up of more than 15 injection molding and mold building companies assembled by private equity funds over a five-year span. Westfall molds plastic parts on demand primarily for health care and consumer packaged goods for more than 250 different companies.

In a typical year, the company molds hundreds of millions of parts at a dozen or so locations around the United States. To make those parts, Westfall buys tens of millions of pounds of more than 100 different plastic resins. In many cases, these resins are proprietary blends developed for specific products that Westfall molds for its customers. As you already suspect, all those corporate entities had their own unique procurement processes.

That's a lot of pressure on an organization like Westfall. There was nothing standardized, streamlined, coordinated or forward looking in the overall procurement process. Did I mention that it was costly and slow, too? The big picture might have even been called undisciplined.

Westfall CEO Mark Gomulka wasn't having that for long. That's where I came into the picture in early 2022 with my experience as the chief procurement officer and chief supply chain officer at both public traded and private companies.

The basics of PPO

Despite that procurement experience, I had never deployed predictive procurement. In fact, when I first heard of it, I rejected it out of hand. Or to be more diplomatic, I wasn't a fan. But I am now.

My conversion with Edmund Zagorin started at a chief procurement officer event that I was chairing, an event that focused on technology trends across the procurement profession in different industries. When Zagorin isn't spending time at conferences, he is the founder and chief strategy officer of Arkestro (which at the time was still called Bid Ops).

Let's start with the generic name itself: predictive procurement orchestration.

Zagorin says it's called predictive procurement because it suggests upfront in the supplier's quoting process a price for the items a company wants to purchase. It essentially predicts a commercial outcome at the beginning. And then orchestration relates to the platform that coordinates all data and communications in the bidding process. As required, orchestration extends the platform's reach to key enterprise software layers at the user.

Drilling down, Arkestro's PPO platform is an embedded layer of intelligence in the form of continuous simulations and predictions running on Arkestro servers and using a range of data points including real-time market data and statistical models to monitor and inject recommendations via email into the procurement process. Westfall procurement staff and suppliers tap into the business opportunity process via email using an interface similar to DocuSign that radically reduces friction from suppliers logging in and having to create multiple profiles with the same customer. Relevant data at key points in the process are pushed to individuals and their personalized control towers, not to a centralized dashboard.

Unlike traditional procurement platforms, Arkestro's PPO process starts with a suggested price, delivery date and other relevant conditions for the buy. Bidders respond by email via the platform to the offer in a series of rounds. In each round, individual bidders are ranked by both a predictive model (e.g., comparing an actual quote against the predicted outcome) as well as versus the other suppliers, to let the supplier know where they stand in the process.

As the process tracks toward an optimal commercial outcome, Westfall's procurement team gets notified with recommendations for award allocation that takes into account the holistic nature of the supplier relationship, commercial history and even factors like supplier risk and operational performance. What was remarkable to us was that in Arkestro this process typically takes days, not weeks or months.

While I generally liked the process of PPO, I did not initially embrace the premise. Why offer a price to a supplier? From that point forward, I'm negotiating with myself. Or so I thought.

This is where I connected the dots to something in game theory I had heard about previously, which is called the anchoring effect. It's a basic premise of Arkestro's PPO that works alarmingly well.

One example of the anchoring effect on human behavior is organ donation in Germany and Austria. While the two countries have much in common, they have dramatically different participation rates when it comes to organ donation.

In Austria, which has a 99% contribution level, all citizens are automatically enrolled in the organ donation program at birth and are forced to opt-out if they elect not to participate. But in Germany, with a 12% donation level, each person must enroll personally or opt-in to be included. In Germany's case, attaining the desired outcome is more work (extra decision points, extra paperwork), not less.

In game theory, the anchoring effect, quite simply, selects the preferred outcome up front in a process that not only removes extra steps, but also establishes the desirability of that outcome. It's the same reason so many marketing messages arrive with a check in the opt-in box for their email newsletter before you even know what the company is selling.

Most people in procurement are taught to never make the first offer in a negotiation. However, making the first offer here is actually a powerful anchoring effect in getting to a preferred price for goods and services relatively quickly. It's not so much that you are guaranteed to get the price you offer, but rather by going first you prevent the other person from anchoring, and the power of the other party's anchor is so influential that people who make the first offer end up ahead.

There is one other benefit. Because no one I know in procurement likes the data input stage of the buying process, it clearly doesn't hurt to suggest a price up front to potential suppliers. Quite simply, it eliminates their need to manually enter that number during the process. This approach is contingent upon the purchaser knowing the category/commodity well enough to predict what the outcome should be in a competitive marketplace.

This is where the AI/ML analytics take center stage to analyze the data and determine the proper place to begin the process.

There's also the matter of taking time out of the process of receiving and analyzing a supplier's quote, whether that's part of a formal bidding process or a spot buy-purchase. We've all been in negotiations that drag on for an extended period of time, maybe even a month or two. And while that time ultimately might result in a lower price, it can be detrimental, too.

For instance, your objective may be to make a buy with the potential to save $1 million a month. If the bidding process extends for a couple of months, that's $2 million in savings that you can never get back. It's referred to as the cost of delay (COD) and can be prohibitively costly. PPO is an antidote.

It is also worth noting that PPO does not, as a process, guarantee the lowest possible price. But from what I have found, PPO does generally get to the best price quickly, which, after all, is only one of the criteria in any buy. And, it does so without taxing the supplier relationship, which for many of our suppliers is absolutely critical.

My experience over the years has resulted in significant frustrations voiced by suppliers when subjected to reverse-auctions for several obvious reasons. This process seems to enable very similar levels of cost reductions through the transparency of the feedback but doesn't result in a fractured relationship going forward.

There is one qualifier here, too. Arkestro's PPO starts with informed pricing based on real-time input from sources that track market conditions. Combined with historical data, these real-time information feeds provide valuable insights that naturally lead to an initial price in the supplier's quote submission process. Because it's data-driven, we don't need to spend a lot of time in pivot tables analyzing quotes on the back end. If Arkestro suggests it to a supplier, we know that it's informed by market data and customized to the competitive environment and supplier base we have at Westfall.

This is not a matter of picking a number out of thin air. Instead, PPO allows Westfall to sufficiently understand the subject matter prior to suggesting a price. Artificial intelligence has a role here. More on that in a bit.

Setting up the pilot at Westfall

Understanding all of this was my "aha" moment with PPO. It's a good fit for Westfall, which beyond making great products, is focused on speed and the lowest total cost of ownership, as well as providing negotiation services to our internal customers and reporting reliable, trustworthy data about our supply base and our cost structure. In procurement, PPO is our best shot at being both fast and highly cost effective.

I got to this point relatively quickly. However, I wasn't the only one at Westfall who needed to understand the value of PPO. IT and the extended procurement team also needed to understand.

At our headquarters in Las Vegas, I pulled together a team of four in April 2022. It included our CIO and other key stakeholders. Unsurprisingly, IT was plenty busy with other projects. They didn't need a procurement guy introducing them to new software that they were completely unfamiliar with.

Here's the good news. As far as Westfall is concerned, Arkestro's PPO solution is a platform. Everything runs on Arkestro's servers not Westfall's. There certainly is software on Arkestro's end, but there is no software to install or learn here at Westfall. CIO Andrew Jankowski was much relieved, to say the least.

We spent the first four hours or so introducing the PPO concept to the assembled team, laying out the premise and the game theory behind it. From there we moved on to a pilot for making an indirect materials purchase of new laptops for Westfall. Within 72 hours, the team had reached an agreement to purchase our yearly requirement of laptops using PPO. In only this pilot, we saved significant time and dollars. Now, we could start to see the real-world potential of PPO for a company that was always buying large quantities of many different direct and indirect materials including plastic resins to service our customers' needs.

This was a live test. People quickly noticed there was no user's manual. That's because all of what was on their screens was highly intuitive. (See sidebar for a rundown on the steps in the supplier quote request process.)

The secret sauce

In a word, the secret sauce here is data—data that's timely and relevant, and packaged up with an action, not data that we have to dig through a dashboard in order to know if

Example of typical process

1. Aggregate and specify demand.
2. Identify potential suppliers.
3. Shortlist and qualify suppliers.
4. Invite suppliers to propose and quote.
5. Tabulate and rank supplier offers.
6. Downselect and negotiate with preferred suppliers.
7. Award business to one or more suppliers based on total value, incorporating quoted price and other relevant factors.

Process with Arkestro

1. Aggregate and specify demand.
2. Identify potential suppliers.
3. Simulate quotes from all potential suppliers using predictive model.
4. Shortlist and qualify suppliers using both history of supplier relationship and simulation.
5. Invite qualified suppliers and propose suggested offers.
6. Provide SKU-level feedback and enable suppliers to revise final offers.
7. Award business to one or more suppliers based on total value, incorporating quoted price and other relevant factors.

we're getting the right quoted price form the best supplier. But it's much more than internal data about already preferred suppliers. It also includes external, real-time market data from multiple sources.

In a traditional procurement operation, internal data points such as supplier profiles are the centerpiece of buying data. They include histories, patterns, fluctuations and frequencies of what has been purchased and for what terms.

In advanced procurement departments, business intelligence software is used. Our CIO Jankowski made sure that when I came in, we had dashboards set up with all of our ERP activity showing our spend and orders and requisitions, all visualized in near-real-time on a set of dashboards. The challenge wasn't that we couldn't see any of our spend. The challenge was: how do we use this when we're interacting with suppliers, and where do we embed and leverage this data during negotiations and strategic sourcing and purchasing activities? As everyone knows, most datasets in procurement aren't always fully accurate, complete or updated to current state. That can also make it challenging to embed or incorporate them into the context of sensitive communications with suppliers. The most frustrating thing is to have so much data that it's impossible to find the needle in the haystack, and the really important insights are only uncovered after it's already too late.

In addition, it is not uncommon for such workstream data to be less than the best quality. But it is the company's data, which carries its own biases. The challenge is to make all data involved in the procurement process complete, consistent and normalized.

With PPO, Westfall easily accessed and enriched internal historical data with Arkestro's predictive models and then augmented these simulations using external, real-time market data. The latter is as disparate as news reports on commodity prices, economic leading indicators and even supply chain disruptions as well as Dun & Bradstreet, Rapid Ratings and many other sources.

But it's not only data. With PPO, data analytics brings a new relevance to the data. And its artificial intelligence and machine learning capabilities allow the platform to learn from the new data and resulting analytics, ensuring more current and precise information.

These predictive models that update themselves based on incoming data from multiple sources are the heart of PPO. This gives Westfall the ability to have a sense of range of preferred outcomes before we even reach out to suppliers.

In other words, the AI capabilities simulate the supplier's quotes before we even reach out to the supplier. As a result, we are not asking for a quote but pushing a suggested offer out to our suppliers. To me, this is really the predictive in predictive procurement, and it helps us take advantage of the anchoring effect and insights from game theory and behavioral science that make our process move faster toward a preferred outcome.

This also puts a different spin on our relationships with suppliers. Typically, each supplier knows upfront the relative possibility of winning a contract based on the suggested price and their history with Westfall. Better yet, decisions can be made in a fraction of the time once required and can better incorporate our internal stakeholders' perspective.

Our suppliers also appreciate the fact that while they have multiple chances to win our business, they are only able to iterate their offers three times. After that, everyone gets fatigued. And with all the information we have prior to starting the first round, there really is no need to go longer than three. Clearly, PPO is not a live reverse-auction with seemingly endless rounds that often force people into making irrational decisions based on a fear of missing out. It's kind of a Goldilocks between the classic RFQ (where suppliers only have one shot to get it right with their best and final offer) versus an auction where there's potentially an unlimited race-to-the-bottom.

For us, and for our suppliers, it's the best of both worlds—not too hot, not too cold, just right.

We have also found that our suppliers trust and appreciate the rankings during the rounds because they are at the SKU level and thus can affect our allocation decisions. Not only are they informed where they rank numerically, but they are told how far they are from the leading offer. We have heard that the feedback is valuable and enhances trust and transparency around our decision-making, as well as making it much faster (rather than going back and forth with them). It also injects a bit of predictability to the process. The rankings actually help our suppliers better target their offers on the parts of our business they are most interested in, and understanding what they need to do commercially to win the business. Three additional benefits of PPO, say our suppliers, are:

- they have an instant idea of where they stand during a quote evaluation process;
- there is a minimum of manual data entry on their part, and;
- they are selling value not only price to us.

Best of all, the level of trust between us and our suppliers continues to build with the new procurement process.

The future of PPO at Westfall

At this point, Westfall is using barely one quarter of the capabilities of PPO. We have a long way to go but are on our way.

To begin, we are using PPO for strategic direct materials sourcing and purchasing across our resins portfolio plus some indirect buys like IT. Where we'd like to be is every single time we're getting a quote, at least run it through the model and see how many of our quotes could be improved and use Arkestro to generate their instant counter-offers to the relevant supplier. We're really excited about this capability because we've seen it show value even when we only have one supplier (provided that it's a single source, not sole source supplier). Our primary emphasis now is integrating PPO into the daily lives of key people at Westfall. That includes rolling out access to the platform to more and more people while ensuring they have access to the control towers that feed data-driven recommendations to them individually.

We are also getting closer to the point where the PPO platform will be tied into our enterprise software systems, especially our ERP system.

Final words of advice

I've come to realize over the past few years that the procurement landscape is changing at a very torrid pace. The tools, techniques and approaches that have been adequate in the past may not be capable of capturing the value required in today's ultra-competitive marketplace. With this is mind, it is important to note that some elements of the past live on forever and should never be compromised no matter the advances in technology. These include the following:

- Informed decisions always drive better results. Avoid "opinion masquerading as fact" at all costs. This is one of the biggest pitfalls in business today as many are afraid to utter those three words: I don't know. As it has been said many times, "if you don't know where you're going, any road will get you there."
- Relationships should never be discounted no matter what technology is in use. Trust remains at the core of everything we do. A win/win is not when one side wins twice.
- Much has been written and said about AI and ML and it is certainly offering a whole new dimension to deal-making and business. Don't overlook the HI (human intelligence) component. This remains key and is why the results of any sourcing activity needs to pass through the business leadership before any final decisions are made to ensure all nuances of the decision are considered properly.

Finally, make sure you make any process enjoyable. For those who know me I've always relied on my sense of humor to work through important and challenging issues. This is serious business, but can also result in serious fun and be quite rewarding when done properly.

PPO allows Westfall to get the best pricing from preferred suppliers on favorable terms more frequently. That's a great value proposition from where I sit.

Procurement: the missing link between sustainability and profitability?

Yves Thill, partner and global procurement lead, strategic operations, Yves.Thill@kearney.com. Vijay Kasi, partner, strategic operations, Vijay.Kasi@kearney.com. Imran Dassu, partner, strategic operations, Imran.Dassu@kearney.com.

De-carbonizing the end-to-end value chain is now an imperative—for the planet and for business. Customers, shareholders and employees demand it, and governments are rushing to mandate it. Procurement is a logical focal point where sustainability and value can intersect. It could soon become a profit center.

By Yves Thill, Vijay Kasi and Imran Dassu

Politics notwithstanding, the Earth's atmosphere is warming, and the warming curve is steepening. Increasingly severe and frequent weather events are taking a toll on lives and livelihoods as they disrupt agriculture, critical infrastructure and global supply chains.

Recent years have brought a string of unprecedented extreme weather events across the globe: heat waves and drought across the Indian subcontinent and parts of Europe; more devastating wildfire seasons in western U.S. states and Australia; intensifying monsoon rains and flooding across Southeast Asia and China; and record hurricanes, flooding and even freezing temperatures in the southern U.S. and Gulf of Mexico.

Regional events can often have global impacts, from crop shortages and higher food prices, to production shutdowns from power outages or water rationing. Unprecedented freezing temperatures in Texas and Louisiana in 2021, for example, shut down facilities producing automotive semiconductors and chemical resins critical to plastics manufacturing, resulting in months of global shortages.

Viewing such events as one-off, regional occurrences in isolation is no longer a comforting option. Organizations that fail to properly acknowledge and assess climate-related risks in their operations and take proper mitigating steps face not

Last year in the United States alone, **18** weather-and climate-related disasters caused more than **$1 billion** in damage each, with damage totaling **$165 billion**, according to the National Oceanic and Atmospheric Association.

In the past three years, **60** events cost a combined **$435 billion**.

The average number of annual events has risen steadily each decade, from **3** in the 1980s to **13** in the 2010s to **20** currently.

Source: "Billion-dollar weather and climate disasters." Q1 2023 NOAA infographic, ncei.noaa.gov/access/billions

only potential direct climate-related damage and disruption but also increasing prices paid in carbon, lawsuits, reputational damage and lost business and investments over time.

Corporate boards and CEOs know they will need to strengthen the specific focus on decarbonization within their broader environmental, social and governance (ESG) objectives.

A major question is how best to manage the enormous challenge of climate resilience and emission reduction—both within and outside the organizational boundaries.

Carbon emissions reduction should touch an organization's entire end-to-end value chain, from raw materials extraction to their product's end use and its eventual disposition. These are broken down into direct greenhouse gas emissions from an organization's own facilities and operations (Scope 1) to emissions from power generators serving the business (Scope 2) to emissions from upstream and downstream suppliers and partners (Scope 3).

CDP, a global nonprofit that encourages companies to calculate and disclose their emissions, estimates that, depending on company and sector, as much as 90% of total value chain emissions can fall under widely underreported Scope 3. The World Business Council for Sustainable Development (WBCSD) estimates that, within the end-to-end value chain, supply chain-related emissions average more than 11 times direct emissions from operations.

Tackling Scope 3 emissions across the supply chain, therefore, is key to achieving meaningful progress in meeting 1.5 degree C and net-zero targets. Embedding sustainability and climate objectives alongside conventional business considerations such as cost and resilience will require both changes to conventional mindset and responsibilities as well as new, collaborative relationships with suppliers and other value chain partners on emissions assessment, monitoring and reporting.

Fortunately, companies already have a function that develops criteria for supplier and vendor selection and manages those relationships for performance and compliance, making it uniquely well-suited to drive net-zero goals: procurement.

Procurement's role in cutting emissions

The UN's 27th annual Conference of Parties (COP 27) in Sharm-al-Sheikh, Egypt, focused on concrete steps to implement member net-zero commitments, provide project financing support for developing countries and improve coordination among government, business and civil society to realize net-zero goals. Forward-looking companies aren't waiting. The past three years have demonstrated the vulnerability of physical goods movement and global supply chains to "black swan" pandemic and climate events. Costs from disruption are compounded in the new omni-channel business-to-consumer environment, where next-generation customers expect not only on-time/in-full (OTIF) delivery, with same-day or next-day service and multiple delivery options, but also a low product carbon footprint and minimal waste in handling and transit. That means optimized routes and loading for fewer, shorter trips, vehicles and equipment running on cleaner fuels, and lean production operations closer to customers—across all tiers of suppliers.

The 1.5% solution: A history

The United Nations established an Intergovernmental Panel on Climate Change (IPCC) in 1988 to assess on a global scale the scientific basis of climate change; its drivers, impacts and future risks; and options for adaptation and mitigation.

Emissions of CO_2, methane, sulfur dioxide and other gases contributing to a greenhouse effect in the atmosphere are seen as the primary cause of global warming. Scientific measurements indicate that, as of 2017, the Earth's temperature had reached 1 degree C higher than the average temperature recorded during a benchmark pre-industrial period from 1850-1900 and has averaged 0.2oC warming each decade since.

IPCC has concluded that a temperature variance exceeding 1.5 degree C will trigger a significant, likely irreversible acceleration in climate change that includes persistent heat waves and drought, heavier rainfall, more severe storms, faster sea level rise and threats to wildlife ecosystems and food supplies in more places. Accordingly, IPCC's 195 member governments set emission reduction targets in the 2015 Paris Agreement to stabilize temperatures at "net-zero" levels by 2030, maintaining the variance at 1.5 degree C. Most members have completed individual plans to meet net-zero goals.

Progress made by governments toward reaching net zero has so far been limited, creating a need for deeper cuts in emissions over the same 15-year timetable. An estimated 45% reduction in CO_2 emissions is now needed to hold warming well below 2 degree C and reach net zero by 2050—raising the associated cost of compliance to a consensus estimate of around $830 billion, according to IPCC.

Amid pressures from customers, regulators, investors and competitors, the greatest risk is the cost of inaction. Potential benefits from operating efficiency, ETA reliability, cost reduction, compliance risk mitigation, avoidance of rising carbon prices and customer retention suggest a path to significant competitive advantage—one in which procurement's role is elevated as a profit center.

Transformation is a fairly straightforward process that includes:

- measuring and setting targets with a clear roadmap for achieving them;
- aligning targets with all upstream and downstream stakeholders; and
- implementing solutions via the right enablers and incentive structures.

It is critical that an organization first establishes a baseline of current, end-to-end carbon emissions for their operations in preparation for setting net-zero targets. Until now most companies have focused their emissions assessments on the lower-hanging fruit—Scope 1 emissions within the organization's direct activities and Scope 2 emissions from purchased energy sources. Scope 3 emissions have proven more elusive, involving multiple unrelated parties with varying degrees of data collection and reporting maturity. That said, Scope 3 is where most emissions and potential reduction benefits are to be found.

Scope 3 mandates are on the horizon.

The EU's Corporate Sustainability Reporting Directive (CSRD), for example, will require companies of 250 or more employees, 40 million euros in annual revenue or 20 million euros in assets to report Scope 3 emissions beginning in 2024, with small and medium-sized companies to follow in 2026. Once the proposed Carbon Border Adjustment Mechanism (CBAM) enters into force in 2036, EU importers will need to declare the quantity of goods and their embedded emissions each year, and then pay an equivalent carbon price in the form of CBAM certificates.

Large companies will need to push change up and down the value chain, using penalties and incentives to encourage measurement and disclosure, with third-party services and data to fill in gaps as needed. Small and medium-sized (SME) suppliers and vendors will need to invest in building measurement and reporting capability to retain competitive advantage in project bidding and integration.

Procurement, already a focal point and central data repository for managing supplier and vendor relationships, is best positioned to lead evaluation, selection, and monitoring because it already performs a similar function for other supplier/vendor attributes.

Small steps first

A set of best practices is emerging with respect to building sustainable and low-emissions value chains. Businesses are advised to start small, based on a realistic budget, and to limit the objectives by "materiality," meaning direct relevance to their operational characteristics, stakeholder expectations and strategic goals in the markets they serve.

Not surprisingly, given the broad public awareness and sense of urgency around climate change, the immediacy and visibility of impacts generated across a wide range of industries, and a growing body of law and compliance standards in place, decarbonization and climate change is now deemed material for most organizations. Established benchmarks for assessment and progress are now in place, from CDP assessment and reporting requirements to the affiliated Science Based Targets initiative's (SBTi) global Net-Zero Standard, offer clearly defined pathways for achieving 1.5 degree C goals for businesses of all sizes.

Within the overall spend budgeted, organizations must first rank current value chain partners for integration based on their maturity and their importance to overall emissions measurement across the entire value chain. It should be assumed that emissions reporting—in particular Scope 3—is a must-have for key partners.

From this starting point, procurement can proceed with building a climate sustainability screening layer to existing selection criteria.

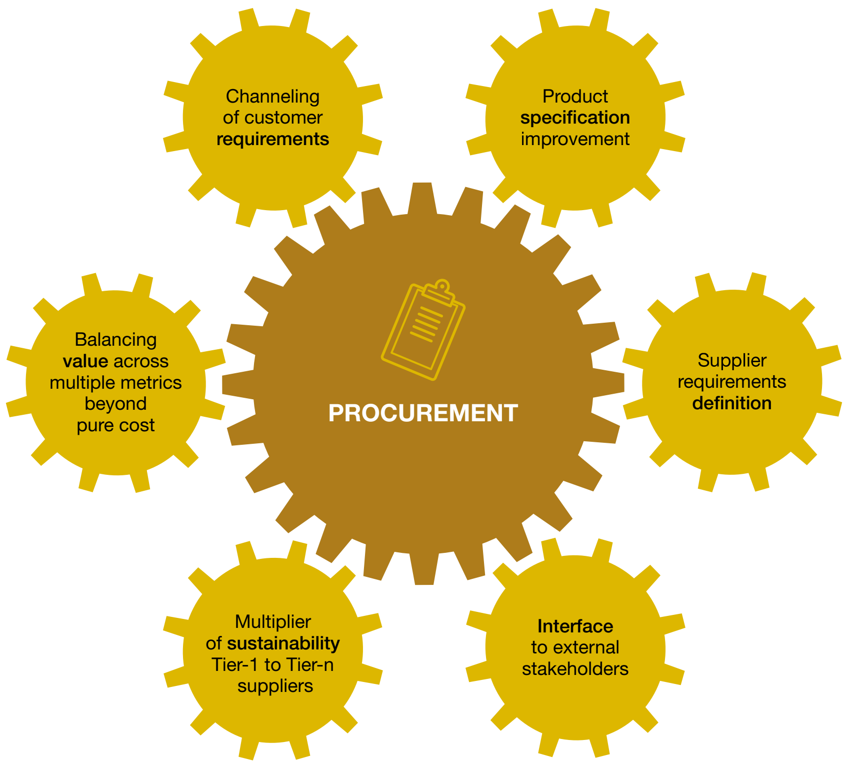
Measure emissions, set targets, and build a roadmap. SBTi's Net-Zero Standard currently calls for a near-term, science-based target of 45% emissions reduction over 5 to 10 years; a 90% long-term reduction by 2050; neutralizing the remaining 10% with offsetting carbon removals; and making further investments and/or purchases of certified credits beyond value chain mitigation after that.

Each company is different in its operational characteristics and level of maturity in assessing, reporting and taking steps to reduce carbon emissions. Currently, less than one-fifth of organizations reporting to CDP actively engage their value chain partners for emissions measurement. Procurement must play the lead role in bridging this gap. After determining Scope 3 emissions and setting targets based on established protocols and guidelines, businesses must then approach suppliers and vendors with realistic targets for reduction and a realistic roadmap for meeting those targets. This process will necessitate rigorous analysis and often difficult choices: what level of overall net-zero reductions is achievable given budgetary constraints and a compressed implementation timeframe? Can certain parties reasonably exceed those targets, offsetting others which will likely fall short? What kinds of support is the company able and prepared to offer? Can and should certain vendors be replaced?

Procurement, with input from other divisions, will need to run these calculations, balancing partner capabilities for measurement and implementing initiatives, and weighing the relative values of partner relationships, sustainability goals, supply chain resilience, cost tradeoffs and so on.

FIGURE 1

Golden opportunity for procurement



Source: Kearney analysis

Align targets with the organization and its stakeholders.

First and foremost, procurement must have a seat at the C-suite table as decisions regarding climate action are made and enacted, and as sustainability is integrated into broader procurement strategy. The procurement function must develop its own vision and targets for achieving net-zero goals, translating those goals into related KPIs and balancing Scope 3-specific and procurement-specific targets based on an understanding and acknowledgment of the organization's distinct, cross-functional needs and objectives.

A less sustainable partner, for example, might offer the most reliable delivery or after-sale service, or its component might feature an irreplaceable, patented material, part or process. Conversely, a low-carbon component may simply prove far more expensive because it must be made differently or precisely because it enjoys the higher level of certification a customer's brand requires. For this reason, internal alignment among procurement and other business stakeholders is vital, with category managers having ultimate responsibility for their targets.

In setting and prioritizing the mix of decarbonization and conventional procurement targets across the organization, climate concerns will need an advocate at the table or, at minimum, a neutral voice to highlight the value proposition climate mitigation represents. Procurement is the logical choice to provide that voice. It must play the role of balancing the top-down organizational targets and expectations with the bottom-up practicality of achieving them, by liaising with the key suppliers and value chain partners.

Implement solutions and build enablers. A final consideration is how the organization engages with suppliers and vendors to meet climate and sustainability goals. Again, all are different in their maturities, capabilities, financial strength and strategic objectives. Companies begin by making measurement and reporting a requirement for participation in their supply chains, with penalties for non-performance. Beyond that, they often work with tier 1 suppliers and vendors to provide support and incentives—compensation, bridge financing, even M&A—to participate.

Swedish telecommunications firm Ericsson requires 350 of its highest-emissions suppliers to set their own climate targets to halve emissions by 2030, and publicly report progress annually; Microsoft requires suppliers to disclose consistent and accurate Scope 1, 2, and 3 emissions data for their value chains; Ikea offers smaller suppliers financing for on-site investments and enables them to more easily purchase renewable electricity.

Carbon emissions reduction doesn't necessarily represent a cost. The right partnerships upstream and downstream can add offsetting value through creative collaboration, as emissions metrics are integrated into supplier relationship management (SRM) models, existing suppliers are pressed to do more, and new suppliers are onboarded. To operationalize this, procurement should build a solid understanding of cost-positive decarbonization solutions and supplier innovations. It is also critical to keep track of the new-age solutions which are not far from being cost positive. This will enable both pushing existing suppliers to go beyond if there is an opportunity to do so and also channeling supplier-driven innovation back to the business stakeholders.

Circularity, through recycle/reuse programs, has attracted growing attention as companies look for ways to reduce emissions and materials waste from conventional manufacturing. As examples:

- Royal Philips' Philips Circular initiative with medical systems suppliers refurbishes and upgrades pre-owned equipment which it then offers under warranty at lower cost on a subscription basis, repurposing and recycling unused parts and materials;
- Ikea franchisee Ingka Group has invested in recycling supplier RetourMatras to expand its fully automated mattress recycling operations across Europe, recovering 85% of materials—foam, metal, textiles, wood—as an alternative to incineration.

Procurement as a change agent

Meaningful change doesn't happen over a day or a month. CXOs need to radically rethink conventional assumptions about procurement in the context of sustainability.

First, they must accept the urgency of climate change, and recognize that sustainability is not just a compliance box to be ticked, but a key driver of future end-to-end, tangible and intangible value. Next, they must weigh competing benefits across functions as they align targets with organizational priorities. Finally, they must view short-term and long-term objectives as inextricably interdependent.

Climate-focused procurement will present a new set of leadership demands. Obtaining buy-in and managing compliance around a single set of standards, both internally and from many unrelated parties upstream and downstream, will at first be daunting for teams accustomed to more traditional KPIs such as cost savings or supply security. They will be working with new digital tools to collate, process and analyze a different stream of data than they are traditionally used to. Their success will be highly dependent on complex collaborations with suppliers and vendors—a "first-movers" coalition—to track performance and make course corrections, often in real time.

That said, procurement already manages supplier relationships across functions, and has deep understanding of product portfolios, manufacturing processes and regulatory frameworks needed to evaluate and monitor for decarbonization in the emerging, complex net-zero environment. With the right people, training, digital capabilities and support in place across the organization, its specialized skill set and mission can deliver profitable growth and a net-zero future.

Tackling sustainability in procurement

Make visibility and collaboration central to sustainability efforts

By Marisa Brown, senior principal research lead, supply chain, APQC

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

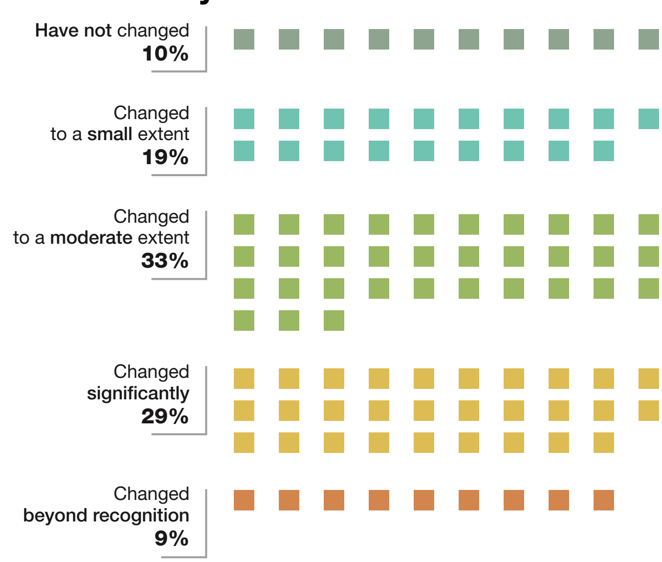
Supply chain professionals have long known that sustainability must be a key piece of their strategy. After the last three years of disruptions, shortages, and instability, the capacity for supply chains to endure is even more important. Beyond addressing disruptions, sustainability considers the protection of natural resources, the equitable treatment of workers, and community development beyond the enterprise.

An organization's procurement efforts should touch on all the components of sustainability. Sustainable procurement includes weighing the environmental, social, and ethical factors in the selection of suppliers and purchasing of products. At the same time, it offers benefits such as efficiency, speed, and risk mitigation.

To determine whether organizations' procurement functions have kept up with the needs of sustainability, APQC collected data from 1,181 global respondents on their organization's procurement processes. The results indicate that procurement processes and systems have evolved considerably over the last five years. As shown in Figure 1, the majority of procurement professionals have seen their organizations' procurement processes and

FIGURE 1

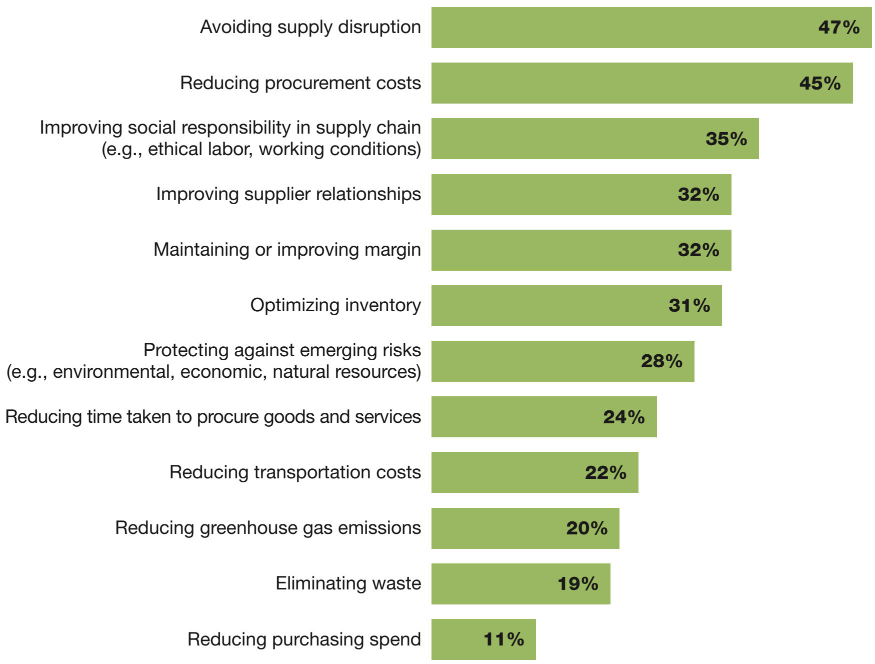
Extent to which procurement processes and systems have changed over the last five years



Source: APQC

FIGURE 2

Most important objectives for procurement



Source: APQC

systems change to a moderate or significant extent.

Nearly one-third of the research participants say that their processes and systems have changed significantly, and 9% have seen changes to the point that these are no longer recognizable. As part of these changes, organizations realize that procurement, and supplier relationships in particular, is key to their sustainability efforts.

Current objectives and goals

When considering the most important objectives for their procurement strategy, participants in APQC's research indicate that sustainability has a solid foothold. As shown in Figure 2, three of the top objectives are related to sustainability. Two are related to environmental factors, and one is related to the social responsibility of procurement.

The third objective on the list, improving social responsibility, reveals the importance of procurement in upholding an organization's standards and its reputation related to social factors. No company wants to be associated with negative labor practices and poor working conditions, and it is up to the procurement function to vet suppliers.

For environmental objectives, procurement can play a part in reducing greenhouse gas emissions by considering this factor when identifying new suppliers and when re-evaluating existing suppliers. Elements that staff can consider include distance from a supplier to the product destination, as well as the practices of suppliers' logistics providers. Although not directly caused by the buying organization, emissions from logistics providers can make an impact on the organization's overall sustainability results and reporting.

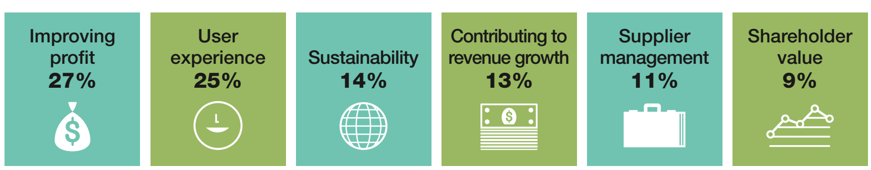
Similarly, procurement staff must consider how waste reduction efforts can make an impact on purchasing. Some organizations are moving to more circular supply chains, in which they adopt remanufacturing and regeneration of products as well as their recycling efforts. If some products or components can be repurposed for additional use, this enables the organization to save money by purchasing fewer new items from suppliers.

Within the top five objectives for procurement is improving supplier relationships, which underpin sustainability efforts. Strong relationships enable organizations to communicate their sustainability goals and work with suppliers to meet those goals in a mutually beneficial way.

Goals for procurement. In addition to having sustainability as part of their procurement objectives, many businesses have also set it as part of their goals for procurement. As shown in Figure 3, 14% of APQC's research participants indicated sustainability as the top goal for their procurement team. This is behind more traditional goals of improving company profit and user experience. It is encouraging to see an increase in the percentage of organizations taking a more holistic view of procurement beyond driving cost savings.

FIGURE 3

Most important goal for procurement organization



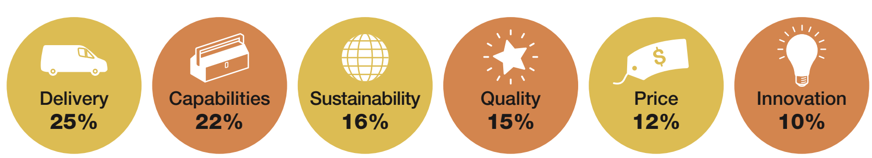
Source: APQC

Similarly, organizations have sustainability as a top focus for supplier relationships. As shown in Figure 4, sustainability again ranks third.

Interestingly, more organizations focus their supplier relationships on sustainability than on price. This indicates a shift in how companies identify and select their supplier partners. This is also illustrated by the fact that more organizations focus their relationships on supplier capabilities than on price.

FIGURE 4

Primary area of focus for supplier relationships



Source: APQC

The top area companies focus on for their relationships is delivery and ensuring continuity of supply. Although delivery methods are connected with emissions reductions, organizations have not yet completely connected delivery with sustainability.

Factors in implementation

To ensure that its procurement function makes sustainability a priority, APQC recommends that an organization first align on any enterprise-wide sustainability strategy. All procurement efforts should be in line with the priorities set by the organization as a whole. This includes defining ownership of the sustainability effort. Within the supply chain, the procurement team may be the most logical choice for this ownership role.

Procurement structure. As part of a supply chain strategy for sustainability, the organization should consider the best structure for procurement. Both centralized and decentralized structures have benefits, especially when considering the type of materials and services a company purchases.

A centralized structure enables a company to take advantage of volume-buying benefits, as well as aggregate data for better supply chain visibility to inform end-to-end decision making. In fact, APQC's research shows that 75% of organizations use a centralized procurement structure for purchasing direct materials and services. For indirect materials and services, the results are more evenly split, with 45% using a centralized structure and 55% using a decentralized structure. This may make more sense for the types of purchases in indirect procurement, as decentralization enables more local control and provides greater purchasing speed.

Business entity role. Organizations should also consider who performs procurement tasks when determining how to execute their sustainability efforts. As shown in Figure 5, most organizations surveyed by APQC perform their procurement processes in-house or rely on a shared services center.

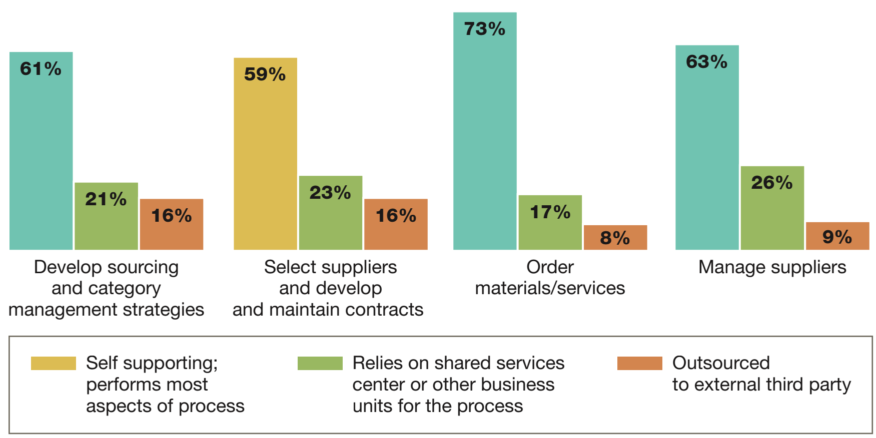
Conducting procurement activities in-house, whether within the procurement entity or through another business unit, strengthens an organization's ability to manage sustainability efforts. Internal teams are able to better align supplier diversity and risk assessment with organizational strategy when identifying potential partners and developing contracts. As the organization manages its existing suppliers, it can ensure that there is transparency in the relationship and that the companies work collaboratively to address any risks that may arise.

Maverick purchasing. A key aspect of deploying a sustainability strategy in procurement is to eliminate employee behaviors that can introduce risk, especially maverick purchasing, i.e., purchases of items where an existing purchasing contract is ignored by employees who bypass standard procedures to procure items individually. The amount of maverick buying that occurs within organizations has increased over the last three years. Prior to the pandemic, the median percentage of organizations' total annual purchase value procured through maverick buying was 1.2%. In 2021 and 2022, however, the median amount increased to 1.8%. This is a crucial difference for an organization with $1 billion in annual purchase value, which would accumulate an additional $6 million in less-controlled maverick purchases.

Maverick buying increases the risk of doing business with a vendor that has not been vetted according to enterprise sustainability standards. Organizations can address purchases made outside of a contract by strengthening their procurement processes and providing employees with the information they need to make sustainable decisions in line with company policies.

FIGURE 5

Business entity role in procurement processes



Source: APQC

Visibility and collaboration are essential

Adopting a greater focus on sustainability in procurement involves both a review of internal processes and strategic collaboration with suppliers. Organizations with experience in applying a process-first approach to business challenges have an advantage in this effort because they possess the kind of deep understanding of their business that is the starting point for any successful change.

Another key element is visibility. Sustainable procurement requires collaboration with partners to ensure that the organization understands the practices and impact of its suppliers. In addition, collaboration can provide access to partner data that enables an end-to-end view of the supply chain. This level of visibility and collaborative relationship provides an opportunity for organizations and their suppliers to jointly target areas for improvement and develop plans that benefit both parties. These efforts are key to ensure the organization mitigates risks and adheres to its sustainability promises.

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

PROMAT 2023 SHOW WRAPUP

ProMat 2023 was held March 20-23 at Chicago's McCormick Place. It featured more than 1,000 exhbits and included a comprehensive educational conference. Here are some of the highlights.

Kardex demonstrated how to take picking to the next level

Kardex (Booth S4325), a leading manufacturer of automated storage and retrieval systems (AS/RS), presented a new picking feature. The company showcased its latest developments in natural user interface technology, where attendees experienced a new way of picking as part of a live demonstration.

Using a pick station, Kardex presented an Intuitive Picking Assistant that projects the relevant picking information directly onto the surface of the access opening. "With this new feature, we are following the trend of intuitive and user-friendly operation with a visual picking display feature that responds to movements and guides the operator, thus enabling ergonomic, fast, error-free picking," said Kardex Remstar's head of technology Tobias Flury.

Booth visitors saw Kardex's entire portfolio of solutions, including vertical lift modules, vertical buffer modules, vertical and horizontal carousel modules and AutoStore systems that come to life using augmented reality.

Christina Dube, regional director, marketing and communication, Kardex.

Yale's David Furman discussed how trends like e-commerce growth and the projected need for more warehouse space are driving lift truck trends like ergonomics and safety.

Yale unveiled new brand identity

Yale (Booths S1212 & S1003) introduced Yale Lift Truck Technologies, a new brand identity to reflect the company's focus on technology-enabled lift trucks and customer-driven design philosophy to deliver solutions for the labor, safety and productivity challenges in today's fast-paced warehouse markets.

The updated brand reflects strengths at all levels of the organization, with independent dealers empowered to provide a seamless, responsive customer experience and the factory developing industry-leading lift truck technology solutions.

"Warehouses face a tough outlook, with persistent labor challenges threatening productivity and risking safety incidents, but when operations look to suppliers for help, they're met with complacency and rigid terms based on what's best for the factory—not the needs of modern warehouses," said Yale's president of marketing, strategy and business development David Furman. "We think it's time warehouse operations rethink what they expect from lift trucks, technology and suppliers."

The independent Yale dealer network plays an important role in enabling the Yale technology experience on the warehouse floor. Dealers are free from the constraints of factory ownership and are instead empowered to focus solely on customer success.

Jusuf Buzimkic, chief sales officer, KNAPP.

KNAPP showcased fulfillment solutions

KNAPP (Booth S631) invited attendees to experience intelligent software tools, as well as complete solutions tailored to e-commerce, grocery, retail, food, wholesale distribution and manufacturing.

The booth offered software experiences and demonstrations focused on six levels of intelligence including: Kisoft WMS/WCS, KiSoft Analytics, redPILOT, KiSoft CMMS, KiSoft Genomix, Automation, AI and KiSoft SCADA.

Attendees experienced three solution models that included KNAPP's latest, highly flexible software enabled technologies. One model showcased how a central distribution center can become an omni-flexible fulfillment center through modular hardware and intelligent software, while another display showcases a dynamic system with zero-touch logistics processes to overcome the limitations of time and space.

"The entire system—from warehouse control and management to labor and transportation management—is self-driving, self-adjusting, self-analyzing, self-learning and self-optimizing," said Jusuf Buzimkic, chief sales officer at KNAPP. "Virtually everything is automated for efficient and cost-effective zero-touch logistics."

KNAPP displayed an experience dubbed "Retail Reimagined," which combined traditional pharmacy central fill with micro-central fill to efficiently handle pharmacy medication replenishment, prescription fulfillment and in-store nano fulfillment.

Conveyco aims to simplify AMR implementation

Conveyco (Booth S418) is helping companies determine the best path to a successful autonomous mobile robot (AMR) implementation with its AMR RightFIT Program. The seven-step methodology analyzes different AMR manufacturers, models and styles available against a company's specific business model, performance KPIs and financial requirements to determine their exact "RightFIT."

By following the methodology, a deep dive data analysis helps determine material flow, eliminating bottlenecks, capacity and labor issues. Having a range of AMR models to select from makes it easier to mix and match to amplify system performance. Likewise, implementing the right warehouse execution system (WES) to manage every AMR manufacturer creates one high performing system, assuring system success and the efficient use of resources.

"Organizations that implement AMR technology without having a holistic vision often create black boxes and islands of automation within their facility, not to mention missing software functionality not provided by their AMR manufacturer or WMS," said Ed Romaine, Conveyco's VP of marketing and business development. "By implementing the AMR RightFIT Program, an organization sees all of its options and gets the performance worth paying for."

Ed Romaine, VP of marketing and development, Conveyco.

Vanderlande presented "Warehousing Answered" solutions

Francisco Moreno, Vanderlande's new president of warehouse solutions, North America.

Vanderlande (Booth S603), a global partner for future-proof warehouse solutions, invited attendees to learn about the integrated systems used in the most advanced DCs.

Vanderlande showcased 'Warehousing Answered' solutions with demonstrations of a modular workstation leveraging an item-picking robot and thought-leadership presentations from Ken Hughes, one of the world's leading authorities on consumer behavior and trends shaping the industry.

"For more than 25 years Vanderlande has invested in the North American market," said Vanderlande EVP of warehouse solutions Terry Verkuijlen. "From proof-of-concept, to production, operation and maintenance, our capabilities reflect our commitment to provide breakthrough solutions."

Continuing its momentum, Vanderlande announced Francisco Moreno as president of warehouse solutions, North America to lead the growth strategy.

Vanderlande exhibited warehouse automation solutions that can be leveraged to address the industry's complexity, including the FASTPICK advanced suite of goods-to-person picking solutions featuring GtP 2.0 (a modular workstation) and ADAPTO (a roaming shuttle-based AS/RS).

Vanderlande also displayed a physical demo of the GtP 2.0 workstation integrated with a robotic piece-picking arm from RightHand Robotics. It also offered digital demonstrations of the intelligent software that controls Vanderlande's highly integrated solutions.

John Sneddon, EVP of sales, systems and marketing for Mitsubishi Logisnext Americas.

Jungheinrich highlighted AGV high-rack stacker

During a press conference, Jungheinrich (Booth S1918) discussed its EKX 516ka/516a, an automatic guided vehicle (AGV) high-rack stacker, as well as other models.

Capable of lifting 3,500 pounds, the compact AGV high-rack stacker has been designed for very narrow aisle operations, featuring 180-degree swiveling forks. It can maneuver in aisles as narrow as 68 inches. Able to lift items up to 511 inches high, it's particularly ideal for high-density storage.

Energy efficient, the stacker requires less maintenance than other very-narrow-aisle turret trucks, leading to low operating costs. In addition, it features a maintenance-free 80-volt drive system and a synchronous reluctance motor. Environmentally friendly, the stacker has an electric powertrain that's quiet and offers emission-free operation.

"We are committed to offering products designed for the next generation that run longer, move more and reduce unnecessary costs," said John Sneddon, EVP, sales and marketing at Mitsubishi Logisnext Americas. "And ProMat 2023 is the perfect opportunity to help attendees find new solutions to meet their demands."

Honeywell showed depalletizer and AS/RS

Honeywell (Booth S618) exhibited several technologies. One, the Smart Flexible Depalletizer and an automated storage and retrieval system (AS/RS) are enhancing productivity while reducing operations' reliability on employees.

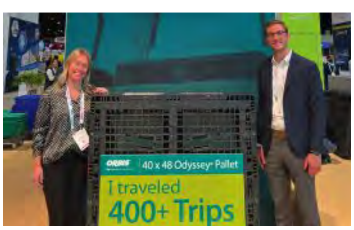
Able to process single- and mixed-SKU pallets in any pattern or sequence, the Smart Flexible Depalletizer doesn't require any human supervision.

"It can remove up to 600 packages an hour from a pallet and then place them on a conveyor belt or other equipment to ensure safe handling," said Keith Fisher, president of Honeywell Intelligrated. "As a result of its capacities, it increases operators' efficiency by 30%, when compared to a manual operation."

Honeywell's AS/RS uses artificial intelligence (AI) and machine learning to enhance the speed of order receipt, processing and filling capabilities, while boosting accuracy (to up to 99.9%).

"In addition, it enables operators to manage more than 20,000 SKUs, while utilizing high-speed shuttles, thereby decreasing their need for labor and enhancing their space, too," Fisher added.

Keith Fisher, president of Honeywell Intelligrated, with the company's Smart Flexible Depalletizer solution, which can work in concert with AMRs (an Otto vehicle featured in the ProMat demo).



ORBIS' Alison Zitzke, senior product manager, and James Riegleman, product manager.

ORBIS showcased sustainable, integrated products, solutions

ORBIS (Booth S4104) showcased reusable pallets, bulk containers and totes and more designed for automated warehouses at its booth. ORBIS offers a range of services to support companies as they make the switch from single-use packaging to reusable packaging.

"We are excited to feature our integrated approach to helping companies improve the flow of product in their supply chain," said ORBIS Corporation's senior director of marketing Bob Petersen. "Our products, plus our team's expertise and insight, bring today's companies significant supply chain efficiency. Showcasing our newest innovations in reusable supply chain packaging lets our customers know our dedication to their work and our planet."

Booth visitors learned more about ORBIS Reusable Packaging Management (RPM), offering a range of packaging management services that extend the useful life of packaging. ORBIS will also conduct Packaging Life-Cycle Assessments, to compare the environmental impacts of single-use packaging versus reusable packaging.

Swisslog introduced next-generation CarryPick goods-to-person solution

Swisslog (Booth S3823), a provider of best-in-class warehouse automation and software, displayed the next generation of its CarryPick mobile robotic goods-to-person storage and retrieval system at ProMat 2023. The solution features faster, more agile automatic guided vehicles (AGVs) to increase performance levels and shorten the return on investment for customers.

The new, upgraded mobile robotic CarryPick platform delivers a significantly improved operating speed, as well as a new lifting turntable, which allows for faster and more flexible storage and picking operations for goods-to-person solutions. The improved movement and speed also allows for more rack presentations per hour to each pick station.

"Our experience and expertise, combined with the faster and more agile new CarryPick mobile

Sean Wallingford, president and CEO, Swisslog Americas and Megan Wolf, marketing director.

robot, allows us to provide flexible solutions to meet the unique needs of our customers for a variety of products and industries, including fashion and apparel, e-commerce, electronics, automotive parts, pharma and medical devices," said Swisslog Americas' president and CEO Sean Wallingford.

The CarryPick solution, which consists of four components—mobile robots, mobile racks, pick stations and Swisslog's SynQ warehouse management software—fits perfectly into existing buildings and can be extended or even relocated on short notice.

Big Joe unveiled user-directed AMR

Big Joe (Booth N6727) revealed its Pallet Mover, a user-directed autonomous mobile robot (AMR).

Created in partnership with Thoro.ai, an AMR designer for commercial and industrial applications, the Pallet Mover can transport up to 4,400 pounds of materials at speeds as high as 2.8 mph. It can operate on a continuous basis for up to 10 hours at a time.

Able to be set it up and operate in less than 1 hour, the AMR can be used for floor-to-floor pallet transportation and drop-off.

"Because the Pallet Mover can be deployed so easily, users will see immediate productivity improvements and have positive returns on their investment, starting on day one," said Bill Pedriana, chief marketing officer at Big Joe.

Able to be used in manual mode at any time, the AMR provides efficiencies to facilities without requiring any considerable changes in operations. Adjustments in infrastructure, aside from Wi-Fi connections for software updates, aren't necessary either.

"Our Pallet Mover AMR, new lithium sit-down forklifts and other new small format lift trucks are all onsite for users to experience hands on," Pedriana added. "Booth visitors clearly saw Big Joe's vision for the future."

Bill Pedriana, Big Joe's CMO, with the user-directed, autonomous Pallet Mover.

Jan Zizka, CEO.

Brightpick showcased new autopicker

Brightpick (Booth N8332) showcased the recently announced Brightpick Autopicker at ProMat 2023. Attendees saw Brightpick Autopickers in action as they pick snacks for people in the crowd. Brightpick CEO and co-founder Jan Zizka was there with his team to answer any questions.

"Our patented Brightpick Autopicker is the most advanced fulfillment robot ever created and is a game-changer in the warehouse automation space," said Zizka. "Until now, there has never been a robot capable of both picking and consolidating orders on its own as it moves around a warehouse."

Brightpick Autopickers are like humans with carts, autonomously picking and consolidating orders as they move through the warehouse aisles. It is the first commercially available autonomous mobile picking robot for e-commerce and grocery order fulfillment.

The fully autonomous, end-to-end robotic solution takes less than a month to deploy, enables warehouses to reduce their picking labor by 95%, and cuts costs for order fulfillment by half. A typical Brightpick Autopicker fleet in a warehouse consists of 15 to 100 robots. The entire fleet and fulfillment process is orchestrated and optimized by Brightpick Intuition software.

The **Raymond Corporation** showcased integrated intralogistics solutions at ProMat 2023

The Raymond Corporation continued to showcase its century-long history of innovation and highlighted the latest in intralogistics, automation and material handling solutions at ProMat 2023. Attendees visited Raymond at Booths S1903 and S1703 to see and learn more about the complete line of Raymond intralogistics solutions.

"For 100 years, Raymond has been designing products to help customers optimize their operations and bring new levels of performance to their warehouses and distribution facilities," said Michael Field, president and CEO at The Raymond Corporation. "We're proud to provide some of the industry's most advanced products and solutions, and we're looking forward to highlighting those products at ProMat 2023."

At ProMat 2023, attendees saw new forklifts, automated solutions and integrated technologies that support Raymond's complete intralogistics solutions, including the Raymond® High Capacity Orderpicker, a first-of-a-kind lift truck delivers market-leading capacity at all heights in various applications and helps optimize warehouse square footage by allowing for more usable space for product and improved SKU count and space allocation.

Michael Field, Raymond's president and CEO, gave an overview of product innovations that improve productivity, safety, and storage density, at a booth press event.

A SPECIAL SUPPLEMENT TO:

SUPPLYCHAIN MANAGEMENT REVIEW

Top 50 Trucking: Is this normal?

As the $830 billion trucking industry prepares for what could be the first full "normal" year since the pandemic caused tidal waves in supply/demand cycles, the "best of the best" are concentrating on strategy, operations and execution. Our trucking correspondent examines what's ahead for trucking in 2023.

By John D. Schulz, Contributing Editor

This year's annual listing of the nation's top 50 trucking companies is a "who's who" of the best in the industry. Ours is a compilation of the largest in both the truckload and less-than-truckload (LTL) carriers. To grow this big means they're largely the best in service across the board—safety, service, culture, diversification, innovation, strategy and execution.

So, we thought it would be interesting to ask the chief executives of a few of these companies what they thought were common denominators when they look at the competitive landscape in trucking in 2023.

"Service stands out, but it's also credibility," says Chuck Hammel, president of Pitt Ohio, No. 15 by revenue on the list of LTL carriers. "It's also a great culture and a caring attitude toward the employee, customer and community."

According to Derek Leathers, chairman, CEO and president of Werner Enterprises, the No. 6 on this year's TL carrier list, companies with a keen sense of purpose and core values can drive success through making them a central component of their overall strategy. "Honing in on a durable and multifaceted long-term strategy provides a sound blueprint to not only weather

Top 25 LTL Carriers ranked by 2022 revenues

(Including fuel surcharges)

Rank	Carrier name	2021 Revenue ($ million)	2022 Revenue ($ million)	YoY % Change 2021-2022
1	FedEx Freight	$8,594	$10,186	18.5%
2	Old Dominion Freight Line	$5,177	$6,177	19.3%
3	Yellow Corporation	$5,078	$5,245	3.3%
4	XPO Logistics	$4,192	$4,645	10.8%
5	Estes Express Lines	$3,783	$4,405	16.4%
6	TFI International	$3,179	$4,023	26.6%
7	ABF Freight System	$2,518	$2,951	17.2%
8	R+L Carriers*	$2,427	$2,864	18.0%
9	Saia Motor Freight Line	$2,289	$2,792	22.0%
10	Southeastern Freight Lines	$1,476	$1,741	18.0%
11	Averitt Express	$1,093	$1,302	19.2%
12	Central Transport International *	$1,046	$1,236	18.2%
13	Dayton Freight Lines	$863	$1,056	22.4%
14	Forward Air	$831	$969	16.6%
15	Pitt Ohio Transportation Group	$792	$912	15.2%
16	AAA Cooper Transportation*	$653	$874	33.8%
17	A. Duie Pyle	$481	$568	18.1%
18	Daylight Transport	$380	$389	2.3%
19	Roadrunner Transportation*	$430	$386	-10.2%
20	Oak Harbor Freight Lines*	$284	$338	19.0%
21	Ward Trucking Corporation	$230	$256	11.2%
22	Magnum LTL	$118	$152	28.8%
23	Midwest Motor Express	$137	$152	10.9%
24	Dependable Highway Express	$117	$131	12.0%
25	Cross Country Freight Solutions*	$114	$130	14.0%
TOTAL TOP 25 LTL CARRIERS		**$46,282**	**$53,881**	**16.4%**
ALL OTHER CARRIERS*		**$4,420**	**$4,841**	**9.5%**
TOTAL LTL MARKET		**$50,702**	**$58,722**	**15.8%**

*SJC estimates
Prepared by SJ Consulting Group, Inc.

an economic storm or other challenges, but to thrive during times of uncertainty."

"Diversification," says Greg Orr, president of CFI, a major truckload carrier that's part of Heartland Express. "Not just in customers, but in service offerings. There are a lot of things that can help diversify a carrier. In fact, the top four or five truckload carriers have all dipped their toes into a different space the last five years or so."

Mark Rourke, president and CEO of Schneider, No. 4 on the TL list, agrees with Orr's assessment. "When we look at ourselves and our best competitors, what's emerging is increased depth and diversification of services. Everybody has their mix of services."

As an example, when Rourke first began in trucking more than 25 years ago, Schneider got approximately 90% of its revenue over the road. Now it's more of a split between over-the-road, dedicated, intermodal rail and other modes, he says.

When asked what his common denominators were for top operators, trucking analyst Satish Jindel, principal of SJ Consulting Group, which compiles our annual top trucking lists, says discipline and pricing. "There's a greater focus on getting paid properly for what they're hauling."

So, as the $830 billion trucking industry prepares for what could be the first full "normal" year since the pandemic caused tidal waves in supply and demand cycles, let's examine what's ahead for the best of the trucking industry in 2023.

"Service stands out, but it's also credibility…a great culture and a caring attitude toward the employee, customer and community."

—Chuck Hammel, president of Pitt Ohio

From the top

First and foremost, the search for qualified drivers continues, with demographics working against most carriers. However, there are signs that sharp increases in pay the last few years may be eating into a shortage that's estimated at 83,000 drivers by the American Trucking Associations.

Second, the merger-and-acquisition rush may not match 2022's madness, but several large truckload carriers may choose to grow by acquisition instead of organically.

Third, carriers feeling the need to replace aging equipment after COVID-related constraints limited their replacement tractor purchases the past two years may find the Class 8 market returning to normalcy.

In the meantime, all of this is occurring as the sectors of the market work to perfect autonomous vehicles as well as those propelled by fuels other than diesel. This is part of the Biden administration's push to meet a stated goal of shifting all new medium- and heavy-duty vehicle sales to zero-emission vehicles by 2040. The question remains: How realistic is that goal?

The economic outlook

Trucking is what economists call "a derived demand industry." That means trucking can't create economic activity much beyond the actual hauling of freight—which largely depends on the health of the economy.

Reading economic tea leaves is always a fool's mission. If it were all that easy and accurate, top executives joke to one another, no one would be working in the thin-margin business of trucking.

"Who knows?" Hammel says when asked for his best economic outlook in this topsy-turvy time. "The economists sure seem to be puzzled as well."

Others are a bit more opinionated in their economic forecasts. "I'm optimistic that by mid-year, maybe sooner, there will be a more normal cycle of replenishment as we turn through that excess inventory, whether that's industrial or consumer,"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Top 25 Truckload Carriers Ranked by 2022 revenues

(Including fuel surcharges)

Rank	Carrier name	2021 Revenue ($ million)	2022 Revenue ($ million)	YoY % Change 2021-2022
1	Knight-Swift Transportation	$4,098	$4,531	10.6%
2	J.B. Hunt Transport Services	$3,374	$4,461	32.2%
3	Landstar System	$2,932	$3,081	5.1%
4	Schneider National	$2,201	$2,787	26.6%
5	Prime	$2,207	$2,605	18.0%
6	Werner Enterprises	$2,023	$2,402	18.7%
7	Penske Logistics	$1,851	$2,300	24.3%
8	CRST International	$1,586	$1,853	16.8%
9	U.S. Xpress Enterprises	$1,568	$1,825	16.4%
10	Ryder Systems	$1,457	$1,786	22.6%
11	Crete Carrier Corp.	$1,304	$1,525	16.9%
12	Daseke	$1,249	$1,398	12.0%
13	CR England	$993	$1,209	21.8%
14	Western Express	$977	$1,138	16.5%
15	PS Logistics	$982	$1,104	12.4%
16	NFI Industries	$855	$1,100	28.7%
17	Ruan Transportation	$875	$985	12.6%
18	Heartland Express	$607	$968	59.4%
19	KLLM	$917	$953	3.9%
20	Marten Transport	$726	$930	28.0%
21	Stevens Transport	$702	$841	19.7%
22	Cardinal Logistics	$658	$821	24.8%
23	Covenant Transportation Group	$623	$752	20.6%
24	Anderson Trucking Service	$665	$750	12.7%
25	Hirschbach Motor Lines	$570	$735	28.9%
TOTAL FOR TOP 25 CARRIERS		**$36,000**	**$42,840**	**18.9%**

Prepared by SJ Consulting Group, Inc.

says Schneider's Rourke says.

Others agreed. "The spring push is around the corner," says CFI's Orr. "You will see things improve as inventories come down. The back half of the year will be a lot better than the first half."

"What we expect is that through the first two quarters of this year we'll see this softness as a result of freight that's already moved, and then we start to move back into a more normal cycle," says David Jackson, president and CEO of the largest truckload carrier, Knight-Swift, during a recent conference call.

Freight movement on U.S. roads, rails and through ports has slowed since the middle of 2022. That ended a boom in shipping during the pandemic, as retailers rushed goods through jammed logistics networks to meet strong consumer demand.

The Cass Freight Index, which measures domestic trucking and rail shipments in the United States, fell 3.3% from November to December. That was the fourth straight month-to-month decline. For all of 2022, the index ended down 3.9% from December 2021.

"There are a lot of things that can help diversify a carrier. In fact, the top four or five truckload carriers have all dipped their toes into a different space the last five years or so."

—Greg Orr, president of CFI

Driver picture improving?

For the first time in at least the last decade, when the subject of finding compliant, available drivers was broached, trucking executives didn't flinch. Whether it's improved pay—Walmart's private fleet drivers earn around $110,000 a year if experienced—or simply greater exposure to the driver shortage, carriers say they're finding a better supply of applicants.

"We've all benefited from publicity of the critical nature of supply chains and the essential nature of truck drivers," says Rourke, noting that Schneider has raised pay by nearly 20% the past two years for most of its 12,000 company drivers. "The nature and stature of the driving position has been elevated, and we're seeing a better supply of drivers entering the industry."

Werner's Leathers adds: "Albeit still a challenging market, the pressure to recruit and retain quality drivers has abated somewhat."

Still, some warn of demographics working against the industry. Average age of a Teamster-covered driver is around 59. Most non-union companies trend younger, but only by a few years. "The more tenured drivers will face retirement in the next one to five years," says Orr. "While we're bringing on younger drivers, it's not at the same pace to replace those retirements."

One longer-term worry for carriers may be the fact that as the newly minted $1.2 trillion infrastructure program begins to be spent, construction jobs will outbid trucking companies for a similar pool of workers. "The economy will come around, and so will finding drivers," adds Hammel. "It seems that the problem is here to stay."

Bullish on LTL

Darren Hawkins, CEO of Yellow Corp., which is transforming itself from three regional and one national carrier into a multi-regional LTL carrier with a footprint of more than 280 nationwide terminals, says that existing LTL carriers with established hub-and-spoke networks will always command a presence. Yellow is the third-largest LTL concern.

While others are exploring new and different revenue streams, Hawkins believes that Yellow is concentrating on doing old fashioned LTL freight better and more efficiently than ever.

That belief recently caused Hawkins to exclaim: "I'm bullish on America, and I'm bullish on LTL. I think the reason so many people are interested in LTL is the barriers to entry are so high. Everyone who follows and is part of the industry is aware of that. We've just simply got a real estate portfolio that can't be replicated."

Hawkins adds that we should expect an economic rebound combined with pent-up demand next year for LTL freight services, which should make 2024 a banner year.

"We've got tremendous opportunity right here in front of us at Yellow, and that's what we're wholly focused on," says Hawkins. "And we're looking forward to what 2023 is going to bring, especially after the nice progress we had in 2022 of delivering improvements that we hadn't seen in over 16 years. So, it's an exciting time to be at Yellow."

What's your biggest fear?

Several executives of top-flight trucking companies were candidly asked about their biggest fears. It was *not* a calamitous economy. It wasn't lack of availability of new equipment. And it wasn't cost and availability of diesel fuel, still stubbornly priced just below $5 a gallon.

In fact, some top carrier executives confided that their biggest fear is being hit with a so-called "nuclear verdict" in a truck accident negligence case. Ever since a highly publicized truck accident involving actor Tracy Morgan of Saturday Night Live fame and a Walmart truck in New Jersey in 2014, trucking executives admit to being scared straight.

Morgan, who survived serious injuries, settled out of court for an estimated $90 million. But hundreds of other far-less publicized cases involving heavy trucks are routinely settled for tens of millions of dollars.

"The biggest thing that keeps me awake at night is what's happening with these verdicts in the courts," says Pitt Ohio's Hammel. "Even when it's not the fault of the driver, just being involved is extremely costly. And it seems to be getting worse.

CFI's Orr agrees: "These nuclear warrants are game-changers. One accident can shut you down. The motoring public are not professionals, no matter the amount of training you give."

The key, insiders and executives say, is for carriers to partner with a great insurance group. "Biggest key is don't underestimate the power of a professional driver," Orr says. "We stock our trucks with every piece of safety equipment, including cameras on trucks so we can validate that we're not the responsible party. The training piece is ultimately the key. Continuing education is vital. Safety is not an option."

Advice for shippers

Carrier executives emphasized that the best way for shippers to aid in efficiency is to form long-term strategic partnerships with a group of core carriers to handle their ground freight needs.

"Many shippers do understand the value and competitive advantage that's created by partnering with carriers who offer reliable, on-time service and low incidents of exceptions and claims, as well as the competitive advantage that can be created by working with a carrier that truly acts as an extension of their business," says Kent Williams, executive vice president of sales and marketing at Averitt, the nation's No. 11 LTL carrier.

"In previous cycles, there always seemed to be a carrier or two that would react to slowdowns by cutting rates to unsustainable levels in an effort to replace declining shipments due to softness in the economy," adds Williams. "Most of those carriers are no longer in business."

John D. Schulz is a contributing editor for Supply Chain Management Review

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