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SUPPLYCHAIN MANAGEMENT REVIEW®

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Taking it to the next level

A few days ago, a colleague sent me "The Death of Supply Chain Management," an article in the *Harvard Business Review.* If the title wasn't enough to grab my attention, the last sentence in the first paragraph had me checking out job openings on LinkedIn: "Within five years to 10 years, the supply chain function may be obsolete, replaced by a smoothly running, self-regulating utility that ….. requires very little human attention." Read more carefully, what the authors are really arguing is that as NextGen technologies find their place in our organizations, the role of the supply chain manager, including procurement managers, is going to change. "The managers and companies working to update their skills and processes today are the ones who will come out on top," they argue.

If you think about it, what they're talking about is taking what we do to the next level. That includes procurement, which is the theme of this month's issue. In our lead off piece, for instance, Coleman Radell and David Schannon, partners at Bain & Company, take an in-depth look at the 22 digital technologies transforming procurement.

We also offer articles on supply chain trust, a key ingredient for procurement professionals who want to get innovation from their best suppliers; how to turn unexpected incidents into winning opportunities; the challenges of end-to-end integration; and finally, how to become a supply chain rock star. The latter is a must read for CPOs, or those aspiring to the C-suite.

And, speaking of taking it to the next level, on April 16, *Supply Chain Management Review* will honor five companies using the technologies that will shape tomorrow's supply chains at our NextGen Supply Chain Conference in Chicago. Our inaugural winners are GEODIS for robotics, IBM for blockchain, Johnson Controls for analytics, DHL for artificial intelligence and Cisco for digital transformation. I want to thank John Santagate from IDC, sponsor of this year's awards, for his input during the selection process.

Bob Trebilcock, Editorial Director
btrebilcock@peerlessmedia.com

If your company isn't listed above, consider applying next year—you'll be in good company. And, if you haven't done so already, I hope you'll register to attend the NextGen Supply Chain Conference, which will be held April 16th and 17th, 2019 at the historic Chicago Athletic Association hotel in Chicago. Designed for senior-level supply chain executives—like you—the conference will offer educational sessions and networking opportunities to learn about the emerging technologies that will power tomorrow's supply chains. You can find more information on the conference at nextgensupplychainconference.com.

I look forward to seeing you in Chicago in April.

SUPPLYCHAIN MANAGEMENT REVIEW

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Things don't always go as planned. New research sheds light on how procurement professionals can successfully manage the unexpected with their suppliers.

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Don't build weapons of math destruction

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

Upon reviewing a model with my first manager at Arthur D. Little, I learned an important lesson. He taught me that while it is important to demonstrate that a model has scientific validity, it is equally important to have "face validity." Translation: To be useful, a model needs to be statistically sound in representing the real world. But, it must also make sense to managers by incorporating factors that make sense to them.

I am astounded to find that many of the Internet-based Big Data models today only have face validity; apparently developers don't care about scientific validity. They believe that if a model's factors seem to relate to dependent factors, those are sufficient. For business models, face validity is necessary, but not sufficient. Indeed, face validity alone might be potentially dangerous. I gained this insight by reading "Weapons of Math Destruction: How Big Data Increases Inequality and Threatens Democracy," a book by Dr. Cathy O'Neil.

What is a weapon of math destruction?

Dr. O'Neil, a former quantitative analyst at a financial hedge fund, experienced first-hand the damage financial models did leading up to and following the mortgage market meltdown of the past decade. They helped the collapse of financial institutions. She became disillusioned with mathematical models that affect society. Or, as one description of the book puts it: "A former Wall Street quant sounds an alarm on the mathematical models that pervade modern life—and threaten to rip apart our social fabric."

Her premise is that the vast amount of Big Data is used in ways that are: "1) opaque; 2) unquestioned; and 3) unaccountable." In simpler terms: 1) the detailed data is not transparent to a person affected by its decision-making; 2) the use of the data is beyond reproach in the mind of the modeler; and 3) modelers refuse to defend the model other than to say "it is what it says." It's akin to using the court of public opinion rather than the law to assess whether someone has committed a crime.

In addition, she states that models often result in behavior that has "vicious, self-reinforcing feedback loops," whereby things get worse for those affected—especially minorities and the poor. While there are many examples in the book, I'd like to focus on two.

Illustrative WMDs

U.S. News & World Report (*USNWR*) was founded in 1933. Fifty years later, in 1983, it was a second-rate publication, lagging *Time* and *Newsweek*, which were then the industry leaders. To set itself apart, the magazine decided to start a service ranking colleges and universities with the intent to help young people make their first big decision. This was a game-changer for *USNWR* because today it markets itself on its website as "a multi-platform publisher of news and information, which includes usnews.com and annual print and e-book versions of its authoritative rankings of Best Colleges, Best Graduate Schools and Best Hospitals."

The initial rankings involved weighted factors that journalists (not educators) felt were reasonable and could be quantified. Essentially, all were face-valid factors, and not necessarily ones proven to be related to educational quality. Dr. O'Neill contends the rankings were too successful, and its model over time was a WMD to education.

The rankings started a "race-to-the top" among universities, whereby they did everything to raise rankings. Because costs were not included among the ranking factors, this incentivized colleges to hire expensive faculty, beef up athletic programs, construct new luxurious dorms and enhance dining menus. Some colleges even resorted to cheating their way to the top, fabricating the numbers they reported to *USNWR*. Parents and students spent a lot of money on college admission planners to get into the top-ranked colleges. In addition, some international students cheated on standardized exams. The author contends that this competition contributed to today's exorbitant tuition costs and student loans, leaving too many minority and poor students saddled with debt they will never pay back.

Another illustration has to do with credit scoring activities of marketers and others using Big Data. The author contends that the well-known FICO scores, used by credit card and other loan providers, are not WMDs. FICO is regulated and transparent to borrowers. A FICO score is based on the financial history of a borrower—not those similar to them. However, these scores, while valid for creditworthiness, are often used for hiring; they wrongly assume that a high score means a better worker. This can lead to wealthy applicants getting jobs over poor applicants (who arguably need them more).

Meanwhile, "e-scores" developed for marketing purposes include factors in addition to the FICO ones. The biggest offender is a borrower's zip code, because average loan-default rates vary significantly by zip code. An e-score is a WMD because it assumes that if my neighbors default on loans, I have a high chance of doing so. Thus, poorer loan applicants may not get loans, or if they do, they are subject to paying higher interest rates. A self-fulfilling prophecy, this increases the chance of these applicants defaulting because payments were set too high.

While there is not much evidence to support the fact that the business community develops WMDs, it might develop models of moderate distortion if they rely too heavily on face-valid factors, without checking for validity.

WMD models in business

The examples I just discussed can wreak havoc on societies, and in particular on minorities and the poor. But, do we have WMD models in the business world? I would say there aren't many, because in business the focus is on attracting and retaining loyal customers and working with the best suppliers—certainly no harm intended. Some business models that appear to be WMDs, might at worst be models of moderate distortion. Below are three examples.

Certainly, Gartner's Top 25 Supply Chains ranking looks like *USNWR*'s Best College rankings. Gartner uses six face-valid weighted factors in rating supply chains: peer opinions, Gartner opinions, return on assets (ROAs), inventory turns, revenue growth and a newly added corporate social

responsibility score. While Gartner's intent is to recognize best supply chain practices with regard to its demand-driven value network model, the supply chain community initially believed it to be the 25 best/excellent supply chains.

Like the Best Colleges report, it started a race to the top. Managers sought access to Gartner analysts and focused on attaining high scores. As I've written in past columns*, it cannot identify excellent supply chains. It just includes big companies, is reliant on opinions based on limited knowledge of supply chain operations and gives too much credit to a supply chain organization for revenue growth to which supply chain managers are not held responsible.

However, this does not make the Top 25 a WMD. After all, it was created by supply chain experts with an intent to stimulate healthy dialogue about what is possible. It would only hurt a company if an organization gamed its way to the top. This, however, would be fully transparent to its company because the only valid judge of a whether a supply chain is excellent is the company in which it resides—not a third party.

Starting in late 2004, I wrote a three-part series on sales and operations planning (S&OP) because practitioners were asking for advice. It provided managers with a four-stage S&OP process maturity model that I believed was needed in support of the resurgence in S&OP.** Similar to the maturity models developed by consultants, my S&OP model gauged how developed a company's process was relative to an ideal.

Consultants often use these to recommend a journey to get to an ideal over time. The S&OP model assessed a company's stage in terms of factors including the meetings conducted; how integrated and extended were the processes; and the extent to which enabling software technologies were integrated. Because the S&OP process involves collaboration and consensus building among the supply, demand and financial components of a company, I assumed getting to Stage 4 would offer the greatest benefit without any data to support this.

Was the model a WMD? I don't think so because I believed, as did the industry, that internal and external collaboration would help companies achieve financial objectives. So, a strong S&OP process would cause no harm, as long as a company installed a truly collaborative process instead of an extremely contentious one that turned out to be detrimental to corporate culture.

Lastly, I wrote about unconstrained vs. constrained demand forecasts, arguing that supply chain planning should be based on true supply-neutral demand forecasts.*** These are forecasts that reflect demand devoid of distortions related to supply surpluses, shortages and other supply factors. Over time, forecasting demand that is not supply-neutral might condition customers to demand products based on availability, rather than on true needs.

I've seen a number of examples of demand distortions. For example, many companies forecast customer demand from shipment data. In some cases, shipments are not the same as true demand, such as when supply factors cause orders to be filled imperfectly (not delivered on-time or as split shipments). When this is the case, a shipment forecast is not the best representation of true demand. Thus, while this type of forecasting model is not a WMD, it is model of moderate distortion; especially when customers become conditioned to accept imperfect order fulfillment. However, a shipment forecast can become a WMD when customers get tired of poor delivery performance and buy from a competitor.

In summary, while there is not much evidence to support the fact that the business community develops WMDs, it might develop models of moderate distortion if they rely too heavily on face-valid factors, without checking for validity. However, if a model leads to decision-making that results in the loss of a customer, I'd say it is destructive.

L. Lapide, "Beware Weapons of Math Destruction," Journal of Business Forecasting, Fall 2018

**L. Lapide, "Competitive Supply Chains: Excellence," Supply Chain Management Review, Jul/Aug 2015*

***L. Lapide, "Sales and Operations Planning Part III: A Diagnostics Model," Journal of Business Forecasting, Spring 2005*

****L. Lapide," First do no harm to true demand," Supply Chain Management Review, Mar/Apr 2016*

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Mistaken beliefs blunt the effectiveness of machine learning

Daniel Merchan is a research affiliate at the MIT Center for Transportation & Logistics. He can be reached at dmerchan@mit.edu.

By Daniel Merchan

Machine Learning (ML) models power technologies that recommend movies we might like, assist in detecting health risks, suggest routes to dodge traffic and beat world-class chess players. Over the last decade, we have witnessed an explosion of emerging ML-enabled solutions across industries from health care to supply chains, enhanced by algorithms capable of making better predictions based on past data. Yet, as the range of industry problems in which ML systems can play a role continues to expand, it is essential to separate the hype from the reality, and understand misconceptions about ML as well as its limitations. Companies also need to be aware of the skills they require to harness the benefits of ML.

Common ML misconceptions

In his seminal paper "Computing Machinery and Intelligence" published in 1950, Alan Turing introduced a test to assess whether or not a machine is capable of learning, of representing knowledge and of performing other cognitive functions generally associated with the human mind. Building on philosophical and technical arguments, Turing's paper laid the foundations of modern ML, and more generally, of Artificial Intelligence.

The ML boom in recent years may mislead us to believe that ML systems are *new*. As the Turing paper shows, the scientific community has been developing this field for more than 60 years.

Take, for instance, backpropagation, a core method used to train deep (multi-layer) neural network (DNN) models that attempt to learn complex data representations by mapping inputs to outputs (i.e., predictions), through mathematical manipulations at multiple layers. The paper introducing backpropagation was published in 1986 by Geoffrey Hinton and colleagues. However, for nearly two decades neither enough data nor computational resources were available to make practical use of the method. Similarly, convolutional neural networks (CNNs), another ubiquitous deep learning method used today for image recognition, was introduced in the late 80s.

What has fundamentally changed over the past decade or so are the conditions

surrounding ML developments. Specifically, the convergence of enhanced ML algorithms, the availability of massive amounts of data to train models and an ever-increasing computing power have energized the adoption of ML across industries. In "Prediction Machines: The simple economics of artificial intelligence," authors Ajay Agrawal, Joshua Gans and Avi Goldfarb argue that making better predictions has become significantly cheaper.

A second misconception relates to the idea that ML models can't fail. In spite of their wide popularity, there are countless examples where ML-based recommendations and reality took very different paths. In fact, results and outputs of ML systems should not be used as definite answers; rather, these are probabilistic outcomes within a certain confidence band. Further, ML systems offer limited value without unbiased and quality datasets for training algorithms.

A third misconception is the belief that ML systems are the solutions to any analytics and data-related problem in industry. Well-crafted ML systems do bring value to problems in which predicting uncertain outcomes is important. However, the fact that an ML-powered system improves predictability does not necessarily translate into value for the business. A few years ago, Netflix announced it had dropped a $1 million ML effort—despite a close to 10 % improvement in prediction accuracy. The company decided that the engineering work required to productionize the effort would offset the benefits.

Last but not least, developments in AI, ML and other fields will continue to redefine the role of humans in a wide variety of tasks. However, a scenario in which robots will take over most jobs is highly unlikely. In the past, industrial robots were confined to performing precise and repetitive tasks. Thanks to advances in ML, AI and automation, robots are also now capable of learning tasks, at a relatively low cost. However, many operations, including those requiring fine manipulation or improvisation are still difficult to fully automate. We expect robotics to continue to take over physically taxing activities, under human supervision.

Supply chain implications

Applications of ML in the supply chain space are expanding rapidly. Demand forecasting problems, for instance, are a natural fit for the prediction improvements associated with ML systems. The German e-retailer Otto has reported replacing its classic forecasting toolset with a deep learning model trained with large and multidimensional datasets to more accurately anticipate customer orders and effectively preposition inventory to reduce delivery lead-times. Other know applications include predicting on-time deliveries or operational disruptions and enabling warehouse automation.

Recent developments suggest two approaches to how ML methods can help improve existing decision-making process in supply chain management. They are detailed next.

Expand the capabilities of existing decision support systems. Decisions in supply chain operations have been traditionally informed by optimization-based prescriptive approaches or simulation-based descriptive tools. Expanding these decision-support systems with enhanced predictive capabilities associated with ML can lead to more robust decision-making processes. For instance, improving vessel travel time predictions, which depend on a variety of factors from port scheduling to weather across multiple geographies, can better inform network planning and inventory allocation strategies.

Unveil new strategic insights. Let us take as an example vehicle routing in last-mile delivery operations. Optimizing the sequence of customers to visit is a well-studied problem in logistics and routing solutions are widely available. However, the increasing availability of transactional, geo-location and telemetric data can help reveal new insights about customer delivery

preferences, driving patterns and urban context conditions that could significantly redefine how routes get planned. Unsupervised machine learning methods can help derive classification of customers, products or services, based on diverse and multi-dimensional attributes, to ultimately target strategies to specific customer types and operational conditions.

However, data quality and accessibility remain a major obstacle to overcome. While large datasets are key to the training of ML models, the complexity of processing, and most importantly, preparing data for analysis must not be overlooked. ML scientists generally spend a large portion of their time finding, cleansing and preparing the data to feed ML models. A sustained ML effort should not underestimate the importance of data management systems.

Skills demands

Effective ML adoption also requires people with the right skills. The term data scientist, in our experience, covers a broad range of industry roles, from professionals dedicated to analyzing and visualizing data, to scientists who advance the development and application of ML. Thus, a simple recommendation to hire more data scientists might not help a company to achieve its ML-related goals. Instead, following are four key roles we believe are essential in any analytics-driven group that supports the supply chain organization.

- ***Domain expertise.*** Supply chain professionals should bridge the development of analytics tools with the needs of the supply chain organization. Domain experts need to be familiar with ML concepts and should also strengthen their data analytics and visualization skills to identify opportunities where ML or other modeling efforts can provide value to the organization.
- ***Analytics expertise.*** Data analytics experts process and analyze data to continuously generate actionable insights for decision makers. They focus on defining, quantifying and visualizing performance indicators using dashboards and other visual aids.
- ***Science expertise.*** Science input must come from professionals with advanced training in statistics, ML, computer science and operations research (OR), leading the development and prototyping of ML and OR-based solutions grounded in rigorous science. Scientists generally engage in problems that span several months.
- ***Technology expertise.*** Technology professionals provide systems and workflows to extract, process and analyze data, as well as the skills to productionize prototypes developed by scientist.

While large datasets are key to the training of ML models, the complexity of processing, and most importantly, preparing data for analysis must not be overlooked.

It is not uncommon to find people qualified to take over more than one of these roles. Also, hiring and developing analytics and ML talent has been facilitated by the growth of massive open online courses, or MOOCs, in this space. Supply chain academic programs are also broadening the scope of analytics training. However, these skills are in high demand and the competition for talent is intense.

Supply chain leaders need to provide the right ecosystems for these four sets of skills to work collaboratively. Ultimately, the collective effort of these four roles is what renders evidence-based insights and science-driven solutions that inform strategic efforts and tactical planning decisions, and to streamline daily supply chain operations.

Starting point

We believe that there is value in exploring the role of ML to support decisions in supply chain processes. Correcting the false impressions that undermine the technology and putting together the right skills with the right tools, is a good place to start.

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Greener supply chains = greater profit

A new survey from HSBC finds that businesses are turning to sustainable supply chains to improve their bottom lines.

Patrick Burnson is executive editor at *Supply Chain Management Review*. He can be reached at pburnson@peerlessmedia.com.

"Navigator: Now, next and how for business," a new survey of more than 8,500 companies in 34 markets from HSBC Navigator, confirms what Global Links readers have suspected all along. The inexorable march toward cleaner supply chains addresses climate change while delivering shareholder value and monetizing new lean disciplines.

According to the survey, almost one third (31%) of companies globally plan to make sustainability-related changes to their supply chains over the next three years. Of those making ethical or environmentally sustainable changes to their supply chains, cost efficiencies (84%) and improved revenues and financial performance (also 84%) are the primary motivations.

This trend comes as companies face increasing pressure from customers to be more sustainable and transparent about their sourcing. With around 80% of a company's environmental impact found in its supply chain, the "green" credentials of strategic suppliers and partners are critical factors in a firm's reputation and performance.

"As businesses explore and invest in ways to stay competitive for the future, the most forward thinking are already taking action," says Bryan Pascoe, global head of client coverage, HSBC Global Commercial Banking. "Transitioning to become more sustainable is not only beneficial for the environment and for society, but for the bottom line too."

Transparency is a key criteria for more than a quarter (26%) of companies when seeking new suppliers, according to the survey, as consumers increasingly want to know where the products they buy come from and how people, animals and the environment have been treated during production.

New benchmarks

Added to this, regulators and investors are putting more pressure on companies to disclose their sustainability practices, which explains why 85% of businesses want to achieve a sustainability standard recognized by their sector or market.

In response, companies in emerging market countries are particularly keen to increase their ethical and environmental standards. More than one in five (21%) businesses based in emerging markets plans to make improvements over the next two years, compared with 15% in developed markets.

As one in five (20%) companies say they have taken greater control of their supply chains over the last two years, this presents a timely opportunity for businesses to assess their networks and take action to become more sustainable, which can help them remain competitive in an increasingly demanding trading environment.

Some are already getting results, with 17% claiming to have reduced their impact on the environment over the last two years.

Banking on change

Making the move to a more sustainable future has many benefits to businesses—and banks have a role to play too. HSBC's network, financial expertise, tools and connections support businesses of all sizes to take the steps needed to become more sustainable and remain competitive in today's world. "A third of companies are planning to improve the sustainability of their supply chains, and we can expect that digitization will play an important part in this," Pascoe contends. "There are great innovations already at play to help transition trade to paperless including automation, machine learning and blockchain technology."

"New technologies also give companies greater control of their supply chains—they have better sight of where the sustainability gaps exist."

—Stuart Nivison, HSBC

Furthermore, says Stuart Nivison, global head of client network banking, HSBC, these technologies will ultimately make trade faster, safer and cheaper, which in turn will deliver huge benefits to the environment. "New technologies also give companies greater control of their supply chains—they have better sight of where the sustainability gaps exist. This contributes to greater transparency, which 26% of businesses rate as a key criteria when selecting new suppliers," he adds.

Nivison also notes that recognizing this trend is half the battle. "We were encouraged to see that peer and industry pressure is supporting companies to improve their green credentials," he says. "Supply chain managers know that if they want to be competitive and gain new customers they have to have evidence of high sustainability standards, and demand similarly high credentials from their suppliers."

Peer pressure

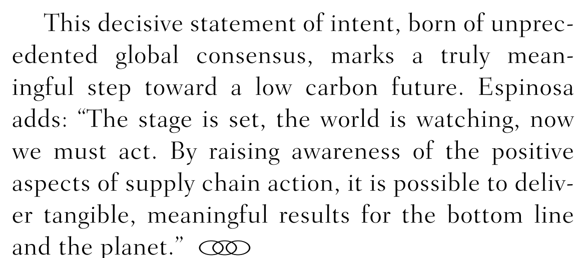
Another pleasant surprise surfacing in this study was that a large number of smaller and medium-sized companies are equally interested in improving the sustainability of their supply chains. "Being green is not only the prerogative of large players," Nivison concludes.

Patricia Espinosa, executive secretary of the United Nations Framework Convention on Climate Change, concurs, noting that supply chain managers participating in the Carbon Disclosure Project (CDP) are beginning to see financial benefits even now. "Action on climate change has never been more necessary or more achievable," she says in a recent report issued by the San Francisco-based think tank BSR.

Headquartered in the United Kingdom, the CDP is an organization that supports companies and cities to disclose the environmental impact of major corporations. It aims to make environmental reporting and risk management a business norm, and drive disclosure, insight and action toward a sustainable economy. "Year after year we see the hottest temperatures on record and the impact this has on the ecosystems that sustain us all. Against this backdrop, the Paris Agreement has entered into force," the CDP notes.

"By raising awareness of the positive aspects of supply chain action, it is possible to deliver tangible, meaningful results for the bottom line and the planet."

—Patricia Espinosa,
United Nations Framework Convention on Climate Change



This decisive statement of intent, born of unprecedented global consensus, marks a truly meaningful step toward a low carbon future. Espinosa adds: "The stage is set, the world is watching, now we must act. By raising awareness of the positive aspects of supply chain action, it is possible to deliver tangible, meaningful results for the bottom line and the planet."

DIGITAL PROCUREMENT

The Benefits Go Far Beyond EFFICIENCY

The economic and strategic benefits of digitizing procurement are real, but the proliferation of competing technologies has made it difficult for companies to figure out where to start. CPOs should focus on solutions rather than products.

BY COLEMAN RADELL AND DAVID SCHANNON

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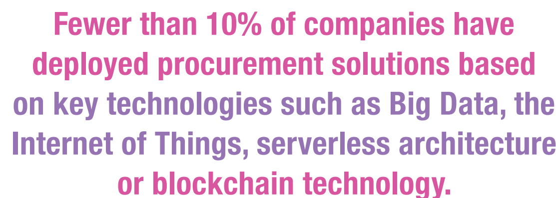
After months of making her case, the chief procurement officer (CPO) of a major multinational walked out of the executive team meeting with a big win—approval for a customized manufacturing process to help speed a new product to market. Her procurement team not only identified the emerging technology, it developed an innovative partnership agreement with two suppliers to codevelop it.

It all began six months earlier, when a business unit leader invited the CPO to brainstorm with his team on how to get a new product to market rapidly. The CPO knew two suppliers, one of which was breaking ground on an innovative production process for rapid prototyping and another using advanced analytics to accelerate design. She proposed co-developing a customized manufacturing solution with the two suppliers. Procurement would orchestrate an agile team to test the process and, if successful, make the case for investing in the new technique. The business unit leader was thrilled.

Leaving the meeting, the CPO mused that five years before, she wouldn't have even known about the suppliers' innovations—or dared to propose that her team help develop a customized manufacturing solution. Most of procurement's time back then was spent on tactical activities and buying products that the business units ordered. The rapid emergence of shared data platforms and emerging technologies created an opportunity for procurement to speed innovation.



That scenario, though fictitious, is likely to become increasingly common in the 2020s as digital technologies pave the way for procurement teams to play a larger strategic role accelerating business innovation. Leading companies already are using digital tools to transform the way their procurement teams work. Artificial intelligence and robotic process automation (RPA) are automating manual tasks and freeing up time for more strategic activities. Some CPOs have begun supporting business innovation and helping implement the company's broader digital goals.

The economic and strategic benefits of digitizing procurement are real, but the proliferation of competing technologies has made it difficult for companies to figure out where to start. Bain & Company research has identified 22 digital procurement solutions, highlighting an increasingly complex environment.

That's one reason many companies have only just begun experimenting with digital tools. Fewer than 10% of companies have deployed procurement solutions based on key technologies such as Big Data, the Internet of Things, serverless architecture or blockchain technology, according to research from Procurement Leaders. For workflow assignment and supplier relationship management (SRM), more than 60% have no tools or rely primarily on improvised systems using Microsoft Office. For risk management, stakeholder management, category management and information sharing, that figure rises to more than 70%. Unlike Cloud-based technologies, traditional Microsoft Office tools don't allow real-time collaboration.

That's a missed opportunity in cost savings and competitiveness. Procurement Leaders' research shows that a fully automated procurement function could save the Global 5000 up to $86 billion annually. For companies with a spending base of $1 billion to $3 billion, that implies $12 million in annual procurement headcount savings. Those that spend $3 billion or more would save an average $27 million on headcount.

Digital technologies also provide a competitive edge by improving the speed and quality of procurement, reducing risk and enhancing innovation. As supply chains go global, they have become increasingly complicated and integrated, and the lines between suppliers, partners and customers are blurring. Companies that harness new tools to enhance collaboration with all those stakeholders will improve their speed and agility, reducing the time from purchase order to invoice. Automating purchasing processes, in turn, will decrease the amount of time procurement teams spend getting invoices paid and free up time for more strategic work, such as identifying smaller, innovative suppliers. Those that wait to digitize procurement risk being outmaneuvered by more agile rivals.

Successful companies wield deep understanding of the supply market and digital technologies to create powerful insights. Their procurement teams harness supplier innovation and take the lead in digital experimentation across the organization or the development of new solutions, such as the custom manufacturing process described above.

This report explores how digital tools can increase the efficiency and effectiveness of procurement and, importantly, how procurement can play a more strategic role in accelerating innovation and contributing to the company's broader digital direction. We conclude with a few practical steps for creating a digital strategy and roadmap.

I. Improving procurement efficiency and effectiveness

Companies have been slow to embrace digital technologies within procurement for several reasons. Many have had a bad first experience implementing digital solutions. For others, the return on investment (ROI) isn't clear, or the executive team doesn't understand why procurement should be a strategic priority for information technology investments. As a result, those in charge of the company's IT roadmap often deprioritize procurement solutions.

But the business case for digital procurement has become increasingly clear as companies gain experience with these technologies and track their performance. And the pace of change is accelerating. One key signal is the amount of capital investors are pouring into the development of digital procurement tools, betting they will produce significant value. Global investment in digital procurement including venture capital, private equity and other forms of investment totaled $475 million in 2017, up from $378 million in 2014 (see Figure 1). The growth in funding and the low barriers to entry have contributed to a proliferation of new technologies on the market.

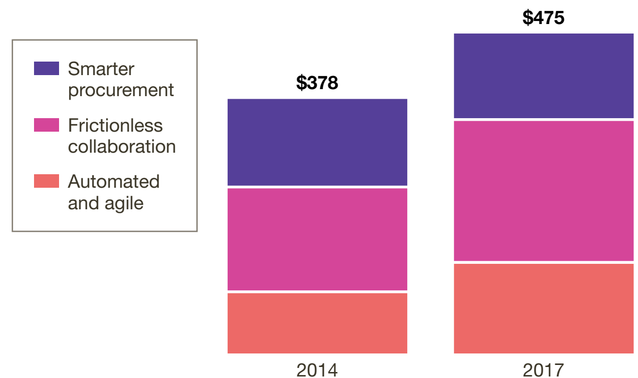
Procurement executives can start to assess the opportunity these technologies offer by understanding how they support three broad areas of change: automated processes, frictionless collaboration with suppliers and other stakeholders and smarter procurement based on richer data sets.

Automated and agile operations. Artificial intelligence and robotic process automation are transforming a critical range of procurement activities including spend analysis and procure-to-pay (P2P). These tools improve efficiency, accelerate processes and reduce errors. IBM, for instance, used RPA to resolve blocked invoices, reducing resolution time to 90 seconds, on average, from 32 minutes previously. At the same time, manual intervention to resolve blocked invoices dropped 95%. The new tools improved quality, oversight and traceability throughout the entire transaction.

FIGURE 1

Global investors are betting on digital procurement tools in three key areas

Digital procurement investments ($ million)



Note: Investments include venture capital, angel investment, private equity, external investments made by companies, financial institutions and other groups

Source: Crunchbase; Bain & Company

The effort was part of a broader IBM initiative to automate every procurement process possible. To speed results, it encouraged employees to automate a process and sent them to a one-week "bot camp" where nontechnical staff could learn how to create simple bots to automate work. One procurement team member created a bot that reduced the time to create a savings report from three days to three hours, freeing up his time for more strategic activities.

Frictionless collaboration. New technologies have paved the way for collaboration platforms, real-time data collection, predictive analytics and blockchain. These tools allow procurement teams to easily share data and help cross-functional teams codevelop solutions with suppliers and internal stakeholders. Frictionless collaboration accelerates cycle times by improving internal coordination and supplier performance. Leading companies already are harnessing these technologies to speed problem solving and generate greater value for the business.

Take the example of a global industrial company that was struggling to achieve its procurement cost-savings targets because key managers disagreed about the data. Procurement insisted it had delivered the bulk of the promised savings, but they weren't visible on the business unit profit and loss statement. The business unit leader explained that he hadn't purchased as much as planned. Meanwhile, the CFO had made adjustments to

the budget that altered targets. The problem was that all three parties lacked access to all of the relevant data. Without a single source of truth, no one could make a clear case for how much the company had saved, or not saved.

To establish a definitive data source, the company implemented a collaborative data platform that included contract records, savings opportunities and methodology, key metrics and analysis and stakeholder signoff. The platform became the single source of truth for all procurement data and included quick access to all business units and functions. That paved the way for transparent and aligned decision making on budget processes and eliminated chronic discord about the total savings hitting the bottom line.

Smarter procurement. Leading companies use digital tools for advanced category management, better sourcing strategies and improved forecasting. The building blocks are richer data sets, optimization engines and tools to control demand and enforce compliance. Advanced category strategies help procurement teams reduce costs by buying better and spending better.

One global technology hardware manufacturer with more than $30 billion in sales had a problem with design engineers choosing parts independently for future products. Instead of asking the procurement team for a list of suppliers vetted for quality and price, some asked their cohorts for suggestions and others chose products after searching online. By the time the company was ready to build the product, it was far too late to consider an alternative part and the company was forced into a weak negotiating position.

To avoid that dilemma, the company deployed a procurement tool that embedded a catalog of preselected parts in the CAD software its engineers were using to design new products. The tool allowed engineers to select parts with pre-negotiated rates, lead times and volume availability. If a part was not available in the approved parts catalog, the engineer could propose a non-vetted part and the procurement team would get an alert in plenty of time to determine the best supplier.

Getting started

As many procurement executives know, the stakes are high for getting a digital solution right the first time around. A failed deployment can dissuade leadership teams from further investments. Procurement executives can begin building a sound digital strategy by choosing two to four digital tools that have a proven track record in the market. A Bain survey of 243 procurement professionals rated 22 digital procurement solutions. Figure 2 below highlights some of these solutions by their proven success in the market and importance in the coming five years.

FIGURE 2

A Bain survey highlights five top digital solutions by category

Source: Bain Digital Procurement Survey, 2018

The tools that scored high on customer satisfaction, for example, include supplier quality management, e-invoicing, transport optimization and collaborative data platform (see Figures 3a and 3b). These are solutions that have a higher likelihood of successful deployment and can help build momentum for digitizing procurement. The next logical step is choosing tools that rank high in importance for the organization and relatively high in satisfaction. They include vendor management solutions (VMS) and multidomain master data management (see Figure 3c). These solutions also are likely to be successful and deliver a meaningful ROI, demonstrating the value of digitizing procurement.

The third cluster of tools includes those ranked high in importance but lower in satisfaction, largely because they are less mature or highly complex. That group includes contract life-cycle management, demand forecasting and network or market data intelligence (see Figure 3d). These solutions are riskier but still important for the organization, so proceed with caution and do proper due diligence to ensure you are selecting the right solution.

The fourth group rated low in satisfaction and low in importance—including dynamic discounting, e-auctions and social procurement tools (see Figure 3e). Companies should be highly selective and customize these tools or await market developments that boost their satisfaction and importance.

Successful companies not only choose their tools carefully, they prepare their organization to make the most of a new digital procurement solution before launching. Three criteria can help procurement executives determine which use cases will deliver the biggest impact for their company—and what they need to do to ensure a successful implementation.

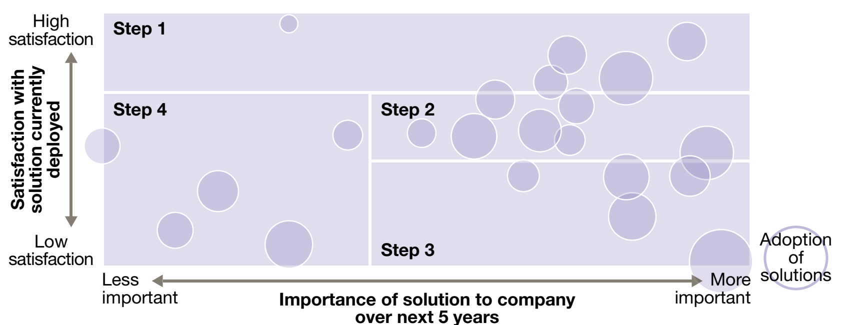
Return on investment. It's not uncommon for technology vendors to inflate the return on investment for any given software solution by including sizable indirect benefits, which may not require any technology investment at all. Procurement executives can come up with a more realistic estimate for return on investment by calculating the direct savings from the tool, indirect savings that can be achieved only with the tool in place and any qualitative benefits such as error reduction or increased speed. A company's business, location and the efficiency of its existing procurement operation, for example, will affect the potential return on investment. If a procurement department is located in a low-cost country, it may not make sense to automate certain functions.

Cross-functional capability, readiness and alignment. Many companies rush to deploy digital solutions without realizing their organization and partners are ill-prepared to make good use of them. Procurement executives can help ensure success by asking a few critical questions first: Do the people who will have to use the digital tools have the right skills—and will they adopt new solutions? Are finance teams tech-savvy and willing to use new invoicing tools? Will supply chain staff embrace demand forecasting? A supplier management tool isn't much use if the supplier continues to ask for a manual report. An honest assessment of how able different teams are to use digital solutions will help you focus on solutions that won't hit a roadblock.

Technology requirements. Many companies make the mistake of assuming digital solutions need to be fully integrated into their existing enterprise resource planning (ERP) system. The good news is that often new tools can sit on top of most ERP systems without being formally integrated. That allows companies a more agile approach deploying best-of-breed tools. Of course, procurement teams should make sure that

FIGURE 3A

A smart approach to digital procurement: Track how users rate solutions by importance and satisfaction

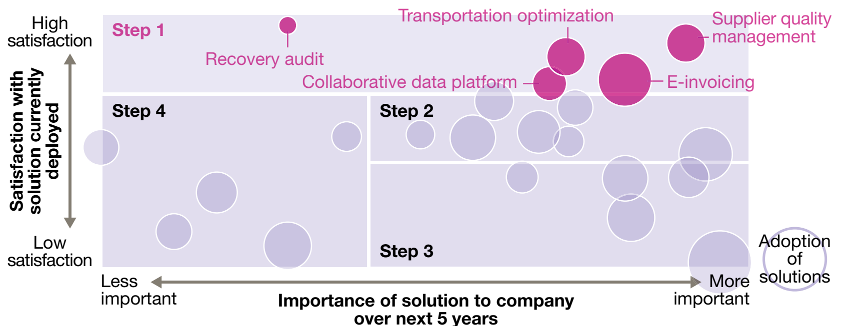


Note: Adoption of solution measured as a percentage of company respondents

Source: Bain Digital Procurement Survey, 2018

FIGURE 3B

Start with solutions that rank high in user satisfaction: Successful deployments build momentum for digitizing procurement



Note: Adoption of solution measured as a percentage of company respondents

Source: Bain Digital Procurement Survey, 2018

the company's existing data system works well with new solutions. IT infrastructure shouldn't limit functionality, and integration should be possible at a reasonable cost and within an acceptable time frame.

II. Enabling the company's broader digital vision

While digital solutions make procurement processes far more efficient and effective than in the past, they also create a new range of strategic opportunities. In fact, many elements of a digital procurement strategy are important input to a firm's digital roadmap. By helping accelerate innovation across the organization, procurement executives can play a vital role in shaping a company's broader digital vision.

New suppliers and new ways of working, for example, are disrupting entire spending categories. A digitally savvy procurement team can enable companies to partner faster with innovative suppliers, embrace new ways of working and lead change. Digital procurement teams can also help companies rethink their operating model, partnerships, talent and culture—before rivals outmaneuver them.

Procuring solutions, not products

CPOs have an opportunity to start changing the nature of their conversations with business unit leaders by focusing on solutions rather than products. As procurement takes on this new role, business units will start coming to them with different questions. Problem statements such as "I need more rapid market intelligence to drive product innovation" or "I need better tracking of my products in the supply chain" will become the norm in the future, paving the way for procurement teams to offer innovative solutions.

For example, an industry consortium including ship builder Maersk is piloting a collaborative project to test the potential for using 3D printing as an alternative to storing thousands of spare parts on ships and in offshore facilities. 3D printing could reduce the space for parts storage and save on both cost and CO_2 emissions. It might also offer real-time access to updated designs for ship systems. Ongoing maintenance, repair and overhaul traditionally have required companies to manage a massive inventory of replacement parts. The company's procurement team is leading the project in the consortium including all the company's major suppliers.

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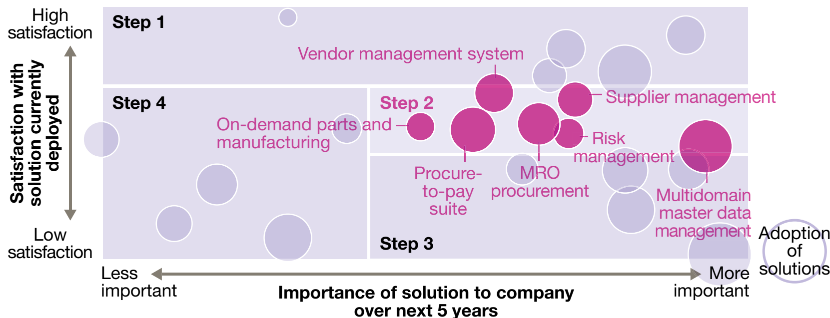
FIGURE 3C

Next, focus on solutions that users rate as most important and high on satisfaction: These tools are likely to deliver on return on investment

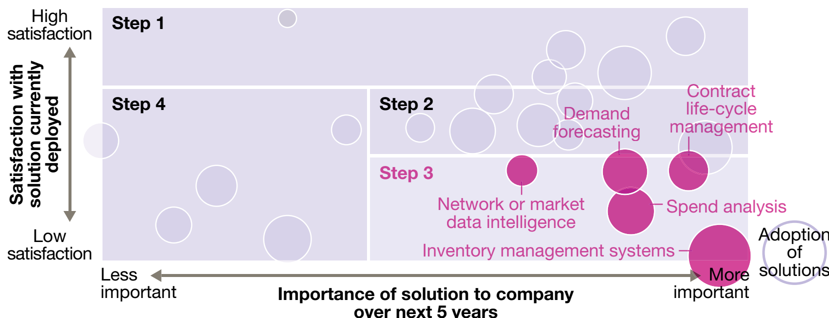


Note: Adoption of solution measured as a percentage of company respondents; MRO is maintenance, repair and overhaul

Source: Bain Digital Procurement Survey, 2018

FIGURE 3D

Proceed with caution on solutions with lower satisfaction ratings; ensure solutions are a good match for your needs

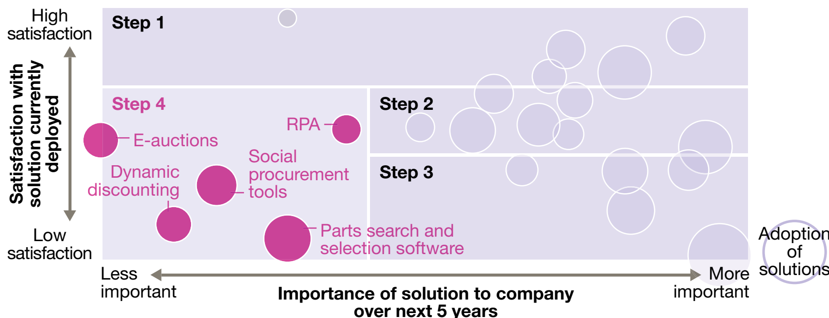


Note: Adoption of solution measured as a percentage of company respondents

Source: Bain Digital Procurement Survey, 2018

FIGURE 3E

Be highly discerning with solutions that users rate low in satisfaction and importance; wait until technology improves



Note: Adoption of solution measured as a percentage of company respondents; RPA is robotic process automation

Source: Bain Digital Procurement Survey, 2018

Marketing is another category of procurement spending that technology has upended. Twenty years ago, sales representatives purchased market reports to glean customer insights and predict future demand for a product. Today leading procurement teams are proposing innovative solutions to bring fresh market insights to companies faster than in the past: harness artificial intelligence and predictive analytics to build a dynamic in-house research capability that tracks customer demand in real time and speeds product innovation.

Procurement executives who seize the opportunity today to accelerate innovation will increase the strategic nature of their work and help bolster competitive advantage. But as external and internal stakeholders recognize that advantage, the practice is likely to become common practice, transforming the role of procurement.

Agile way of working

As companies face growing pressure to speed new products to market, agile procurement teams with deep knowledge about emerging technologies can help shrink development time by brokering collaborative relationships with innovative suppliers. Test-and-learn or innovation-based relationships will require procurement heads to work hand-in-hand with business unit leaders as well as a growing number of smaller vendors, including start-ups and sharing-economy platforms.

In that role, procurement teams will need to develop more flexible contracts that incorporate greater tolerance for risk. Companies pioneering collaborative supplier relationships use performance-based contracts to achieve a specific goal,

like the new manufacturing technique described earlier. Another option is a contract incorporating a series of consecutive development goals with shorter defined sprints, a proof of concept or continuous releases. Additionally, large companies will need a new approach for dealing with promising companies that may not yet have a legal team.

Talent of the future

Leading companies are adding new talent to support a digital operating model. To develop sharp insights using digital tools, procurement teams will need data science and analytics expertise. Procurement executives are finding that it's more effective to teach data scientists how to deploy that expertise into the procurement world than to teach data science and analytics to procurement professionals. This talent profile is also increasingly entrepreneurial. Category strategies are changing more rapidly than in the past, and unless one remains proactive about understanding the latest technologies, vendors and competitive landscape, the company may fall behind.

Finally, procurement executives increasingly will act as stakeholder managers and orchestrate agile teams to operate across the business, increasing the need for collaborative skills. Working in Agile takes time to learn, but building this capability is increasingly becoming a strategic imperative for chief procurement officers across all industries.

As a growing number of companies embrace digital procurement, those remaining on the sidelines will become less competitive.

III. Creating a procurement digital strategy and roadmap

For CPOs, making the most of the opportunities created by digital technologies can feel daunting. Leadership teams expect procurement teams to master these technologies and provide better service without increasing the cost of procurement. The good news: A digital procurement strategy can help reduce costs and free capacity for more strategic activities. That requires a clear roadmap. In this section, we highlight the three-step process procurement executives can use to start shaping a digital vision: Gather input; create a vision; and design a roadmap to get there.

Many procurement teams rush to create a digital strategy in a vacuum, often failing to achieve the intended benefits. To ensure a well-designed strategy, start by gathering information on digital trends from the company's leadership, your industry, the market and procurement experts. What solutions and vendors are procurement executives in your industry adopting? What are the company's digital goals and strategy? The answers to these questions provide critical context to identify the right digital procurement strategy.

The second step is creating the vision for procurement's future role—say, three years to five years from now. What processes should be digital and what solutions do you want to implement? Define how procurement will work with the business unit leaders and vendors to accelerate innovation and results. What kind of data, analytics, systems and technology do you need to support that role? What operating model and partnerships will you require?

The third step is a roadmap to implement the vision for a new role for procurement. Once the basic elements for a digital shift are in place, CPOs can set priorities including near-term goals that can create momentum for change, key investments, a detailed business case for the investment and a timeline.

Our research shows that 80% of procurement professionals believe that they need to do more to take advantage of the latest digital tools. In our experience, leaders put a few basic elements in place to get the most from new solutions:

Clean, high-quality data. One data set becomes the single source of truth for all stakeholders.

Agile operating model. Clear roles, decision rights, governance and agile ways of working help procurement teams enter into strategic conversations with business unit heads and develop new supplier partnership models.

Digital and entrepreneurial talent. To support innovation more effectively, whether it is cocreating solutions, managing prototyping or speeding time to market, procurement teams of the future will need advanced digital skills and entrepreneurial ability.

Five years from now, CPOs may feel amazed about the increasingly strategic nature of their role—much as in our opening scenario. But not every company will make the transition. Procurement executives are standing at a crossroads today. They can either lead change by adopting digital solutions and developing new capabilities, or they can wait on the sidelines and react to a shifting landscape. And as a growing number of companies embrace digital procurement, those remaining on the sidelines will become less competitive.

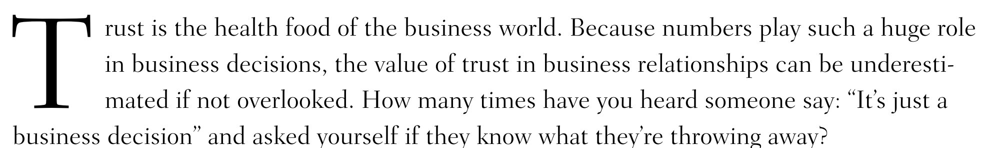
Procurement professionals who are able to make this strategic shift will not just reap big gains in efficiency. They will lead in transforming the role of procurement and help enable a digital vision for the entire company.

***Select research for this article was provided by Procurement Leaders, procurementleaders.com.*

Do You Trust Me?

Trust is at the heart of every supplier-customer relationship. A recent survey of almost 250 suppliers identifies nine key attributes and seven guidelines to help customers build, maintain and advance trust. The payoffs for customers range from better communication to improved collaboration and preferred customer status regardless of contract length or size.

BY ROBERT J. TRENT



Trust is the health food of the business world. Because numbers play such a huge role in business decisions, the value of trust in business relationships can be underestimated if not overlooked. How many times have you heard someone say: “It’s just a business decision” and asked yourself if they know what they’re throwing away?

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The fact is: Trust is essential to every business relationship and often sways decisions beyond the numbers.

Nowhere is that more evident than in supplier-buyer relationships. How an industrial customer engages with its suppliers is often the difference between receiving game-changing preferential treatment and watching from the sidelines as others prosper. Clearly, trust relates to and enables these successful business relationships. The irony is that something seemingly as intangible as trust affects so many variables that are quite tangible. It's never "just business" when it comes to the buyer-supplier relationship.

Clearly, becoming the customer of choice and receiving preferential treatment from suppliers is something that is earned rather than given. But how does that happen? A survey of almost 250 suppliers shows what trust looks like and how to build it.

Understanding the concept of trust

Trust is a deceptively simple word. General perspectives usually describe the concept in terms of the reliability, honesty and ability of a person or thing. Others say that trust involves a willingness of one party to be vulnerable to another. Still others characterize trust as perceived trustworthiness. With this perspective, a person who aligns his or her words and actions with their behavior has the best chance of being perceived as trustworthy.

A widely cited perspective of trust defines a set of essential elements that form the foundation of trust-based relationships: the demonstration of ability, benevolence and integrity. Applied to supplier-buyer relationships: *ability* represents the supplier or buyer's likeliness to perform; *benevolence* represents a supplier or buyer's unwillingness to behave opportunistically toward the other party, particularly when the opportunity to do so presents itself; and *integrity* relates to a commitment to fairness, justice and ethical behavior.

There is also the matter of trust among organizational work teams. Research shows that trust among team members indirectly increases team performance by motivating members to share information and work together. Trust also helps remove any emotional and interpersonal obstacles to effective team functioning. The presence of trust allows members the freedom to devote a greater proportion of their time toward team tasks.

Stephen M.R. Covey says that trust is hard, real, quantifiable and affects both the speed and cost of a relationship. When trust is present, the cost to manage a relationship decreases while the speed or rate at which things are accomplished through the relationship accelerates. Furthermore, trust is a function of both character and competence. It can be created as well as destroyed. It can be effectively taught and learned. It can be leveraged to gain strategic advantage. And when trust is lost, it can be reestablished, although at a significant cost.

Covey further maintains that a lack of relationship trust also carries a tax. It is an economic burden that must be borne by parties as they discount and often must verify what they receive from another party. This tax is real, measurable and often extremely high.

Conversely is the notion of a trust dividend. This dividend leads to improved communication and collaboration; better and faster execution of decisions; enhanced innovation and strategy development; and stronger engagement with the other party(s). Preferential treatment from suppliers is an important part of the trust dividend.

Experts have concluded that companies with the most trusting supplier relations also have the most financially rewarding relationships. First, building trusting relationships with suppliers is a financially responsible activity that every company should undertake. Second, by working to create trust-based relationships with suppliers, it is more likely that a customer receives meaningful supplier-provided benefits not available to other companies. Higher trust equals greater benefits. Lower trust means benefits foregone.

In sum, trust forms the basis upon which relationships are built. It is driven by a collaborative culture that supports teamwork, open and honest communication as well as innovation between companies. Furthermore, most individuals have an intuitive belief about the importance of trust.

While trust has received a great deal of attention across a variety of disciplines, there has been little research into the linkages between trust and supplier-buyer relationships. A recent *Supplier Satisfaction Survey* looks into that. The survey is a reverse scorecard—suppliers evaluate industrial customers, not the (traditional) other way around. The data is from suppliers identified by two major industrial companies as their most important suppliers. Customers were assessed by suppliers in 12 key areas (see Table 1).

Researchers worked with executives at each supplier to identify the individuals best positioned to respond to

the survey. Suppliers provided data during a six-week data collection period. During this time, researchers maintained strict control over the data collection process. Suppliers could answer questions without fear of reprisal, particularly if they provided less than favorable ratings or comments. The researchers controlled all communications with suppliers throughout the study.

Several sections of the survey directly address the trust that a supplier perceives exists between itself and its customer. Combining the data from the two studies revealed a set of powerful connections between these trust-related items and other facets of supplier-buyer relationships.

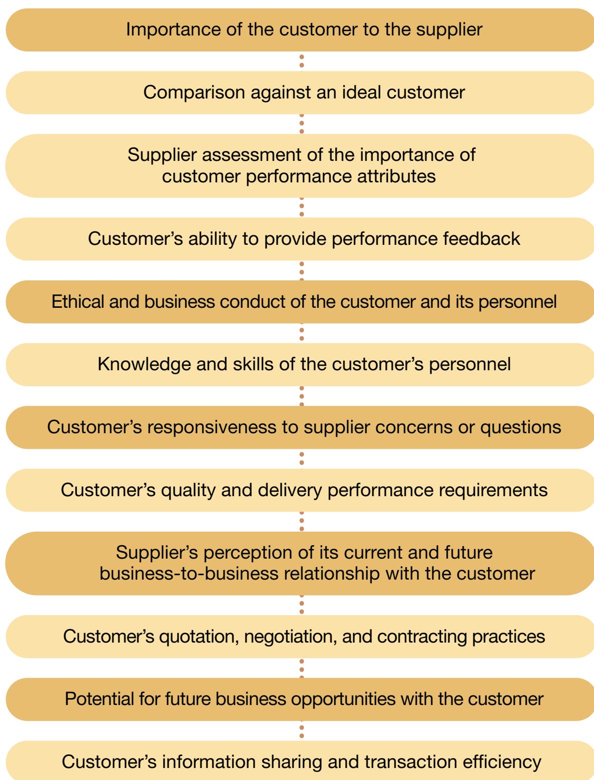


TABLE 1
Areas in which suppliers assess their customer

Source: Author

Survey findings

While the survey contains hundreds of data points, only those that show the strongest relationship with trust are featured here. The two most important findings are the first and last. The other seven should be regarded as of relatively equal importance to each other. Identification of these nine leading trust factors supports a better understanding of how to develop and manage trust-based relationships.

Finding 1: The trust that suppliers have with an industrial customer does not relate statistically to any demographic variable studied.

One of the two most important results, this "non-finding" reveals that trust does not relate to certain variables, countering some commonly held beliefs.

To begin, no statistical relationship exists between supplier size in terms of the company's total revenue and the level of trust the supplier has in the customer. In other words, trust with the customer is no higher or lower for smaller suppliers compared with larger suppliers. Furthermore, the level of trust perceived by a supplier shows no statistical relationship to the size of the buyer's contract. Finally, the length in years of the supplier-buyer relationship shows no statistical relationship with the trust level.

Quite simply, trust between a supplier and customer relates strongly to customer behavior rather than demographic variables.

Finding 2: Supplier trust relates directly to the level of satisfaction suppliers have with a customer. Furthermore, suppliers that are more satisfied are more likely to say the customer is a preferred customer.

A strong correlation exists between the trust that a supplier says defines the supplier-buyer relationship and the level of overall satisfaction the supplier has with that customer. Extending that line of thought, a customer is unlikely to gain preferred status if a supplier is dissatisfied with its customer. A clear linkage exists between a customer's preferred status and a supplier's willingness to provide preferential treatment to that customer.

Finding 3: Specific areas of customer performance relate higher to supplier trust.

The survey asks suppliers to compare their customers' performance in a range of areas against an ideal customer. These areas were identified through focus groups with suppliers, previous research and experience. The performance areas that correlate the highest with trust are revealing in terms of where suppliers say their customer performs best. The 10 behaviors from most to least important are:

- exhibit ethical and respectful behavior;
- develop effective supplier-buyer relationships;
- pursue efficient negotiating and contracting practices;
- provide tangible support if problems arise;
- provide clear channels of communication;
- be receptive to the supplier's improvement ideas;
- be knowledgeable about the supplier's business and industry;
- offer longer-term business opportunities to the supplier;
- commit to continuously improving the supplier-buyer relationship; and
- respond to supplier inquiries in a timely manner.

These abilities directly tap into behaviors that affect a supplier's trust perception. An industrial customer's performance in these areas affects the level of trust the supplier has in that customer. If a customer performs well across these areas, higher trust should result.

Finding 4: A belief that customers will protect confidential information relates directly to a supplier's trust in a customer.

Unusually strong correlations exist between the confidence the supplier has that the customer will protect proprietary or confidential information and trust. This relates directly to the integrity dimension of trust. It includes protecting information and data submitted in quotations and/or proposals; internal cost data; product and process improvement ideas; current product designs; future product development plans; and supply chain improvement ideas.

A popular perspective of trust includes a party's willingness to accept vulnerability based upon positive expectations of the intention or behavior of the other party. Here, the presence of trust allows a supplier to reduce its vulnerability in an area where many suppliers normally perceive risk—the misuse, misappropriation and theft of intellectual property and confidential information.

Finding 5: Trust relates strongly to the perception that the personnel that suppliers interact with at a customer are knowledgeable and qualified.

This finding highlights the important role that individuals play within the supplier-buyer relationship. It taps into the human aspect of the *ability* dimension of trust. A solid correlation exists between a belief that the personnel at the customer are knowledgeable about the supplier's business and supplier trust. It is logical to conclude that qualified personnel have a powerful influence on a supplier's perception of a customer's trust and performance. Areas where personnel should be knowledgeable include the purchase contract; economic changes and trends including emerging technology that affect the supplier's industry; the supplier's cost and operating structure; and the supplier's production processes, delivery processes, quality management systems, and capacity constraints and limitations.

This finding raises some interesting questions related to how a firm manages its human talent. It is not unusual for supply and supply chain personnel to rotate between positions, sometimes every 12 months to 18 months. When this is the case, a risk is present that the relationship learning curve regresses as newly assigned individuals work to rebuild the supplier-buyer relationship. Some suppliers in this research complained about personnel turnover at the customer because it affected the quality of their relationship. The important role that individuals play within trust-based relationships should not be minimized.

Finding 6: A strong relationship exists between the quality of communication that takes place with a customer and the trust the supplier has in that customer.

This finding further underscores the important role that individuals play within the supplier-buyer relationship. While some communication will be electronic, it is hard to envision a trust-based relationship that does not feature direct communication between people.

The survey addressed communication from multiple perspectives: the timeliness of responses when the supplier contacted the customer with concerns or questions; the accuracy of those responses; the completeness of responses; and the courteousness of personnel when contacted with concerns or questions. The ability of the customer to perform well on each of these items correlates highly with the suppliers' perception of trust.

Higher levels of trust also relate to a supplier's belief that personnel at the customer take the supplier's business concerns and questions seriously. Trust also correlates strongly with a supplier's belief that customer personnel are willing to work with the supplier to resolve performance issues or misunderstandings.

Finally, suppliers who indicate a higher level of trust are also more likely to say they are confident their customer will not be punitive or seek retribution if presented with less than desirable news. This relates to the *benevolence* dimension of trust. Personnel at the customer who are able to communicate effectively with suppliers are an integral part of the trust equation.

Finding 7: Higher trust correlates directly with positive outlooks suppliers have about customer negotiations.

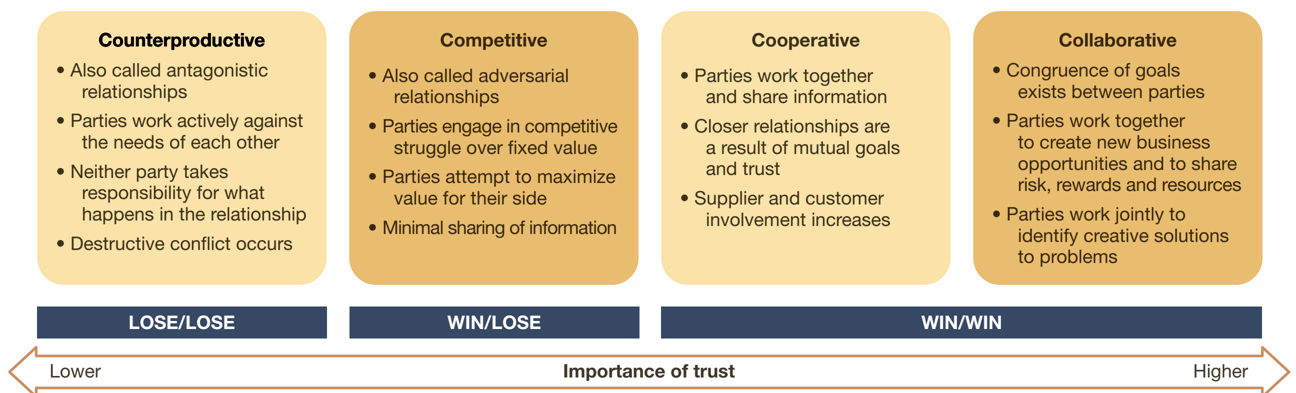
Few would argue against the notion that negotiation is a process of communication. Progressive companies view the negotiating process as an opportunity to enhance a relationship and to search for new opportunities jointly rather than as a means to punish or coerce another party. Positive communication put forth during the negotiating process typically enhances the relationship strength as well as the trust that underlies it.

A variety of factors related to negotiation correlate highly with trust. The supplier's perception of trust increases as: the customer uses the contract negotiation process as an opportunity to strengthen the business relationship; negotiations with the customer focus on how to create new value from the business relationship; and negotiating with the customer is a positive experience. Negotiation is a specialized part of the communication process that can enhance the trust that underlies a relationship.

Finding 8: Trust relates strongly to the kind of relationship suppliers perceive they have with a customer.

Figure 1 presents a continuum of relationships, a version of which respondents used to evaluate their current and expected relationship with their customer. Suppliers who say they have a higher degree of trust with their customer are much more likely to say they have a cooperative or even collaborative relationship with that customer. The relationship between trust and the relationship the supplier perceives it has with its customer is one of the strongest findings in this research. In all likelihood, the presence of trust has enabled the parties to evolve to a level that features the open sharing of information, resources, risks and rewards.

FIGURE 1
A continuum of supplier-buyer relationships



Source: Author

Finding 9: Trust correlates directly with a greater willingness by suppliers to provide preferential treatment to a customer.

This is the most important finding presented here because it is the only one that links trust with a supplier's willingness to provide preferential treatment to the customer. A primary objective of trust-based relationships should be the receipt of benefits that are not readily available from relationships that feature lower trust.

Why is receiving preferential treatment so important? A supplier's willingness to provide benefits ebbs and flows with the level of trust a supplier has in its customer. The challenge is to create an environment where suppliers willingly provide non-price benefits that are not necessarily available to other customers, some of

whom may be the customer's direct competitors.

What types of favorable treatment might a customer receive from a supplier? Table 2 provides a listing of supplier-provided benefits segmented into three categories: supplier-provided direct investment, favorable treatment, and product and process innovation. This table includes the benefits evaluated by suppliers during this research.

As trust and satisfaction with a customer increases, suppliers are increasingly willing to provide their customer with valuable kinds of preferential treatment. They are listed here from most to least important:

- first allocation of output when the supplier's capacity is constrained;
- better pricing;
- preferential scheduling of orders;
- early insight into future product technology plans;
- more favorable payment terms;
- access to executive personnel at the supplier;
- access to supply market information that the supplier possesses; and
- shorter quoted lead times compared with other customers.

It is worth noting that these factors almost always require the supplier to provide something of value. Not all suppliers are willing to do this regardless of how they feel about their customer. Second, some suppliers may simply not think about or understand how to segment customers based on their satisfaction with them. They simply may not be accustomed to providing preferential treatment.

TABLE 2

Examples of supplier provided preferential treatment

Supplier-provided favorable treatment
• Shorter quoted lead times
• Preferential scheduling of orders
• Early insight into future technology plans
• More favorable payment terms
• Performance improvement ideas
• More frequent deliveries
• Access to the supplier's executive level personnel
• Access to market information that the supplier may possess
• Better pricing
• First allocation of output if supplier capacity is constrained
• Early warning to potential supply problems

Supplier-provided direct investment
• Personnel to work directly at the customer's facilities
• Capacity dedicated to the customer
• Engineers to support customer's product development needs
• Investment in new equipment that benefits only the customer
• Exclusive use of new technology developed by the supplier
• Inventory held to support the customer's needs
• Direct financial support if needed
• Information technology systems unique to business with the customer

Supplier-provided innovation
• Product innovation
• Production process innovation
• Process innovation involving non-production processes

Source: Author

Guidelines for promoting trust-base relationships

These findings provide a framework for managing trust-based relationships, often a differentiator in highly competitive markets. Trust between suppliers and buyers, however, does not occur by chance. It is the result of concerted efforts that recognize the need to develop trust-based relationships. The pursuit of higher trust with suppliers will help transform an aspiration into an accomplishment. Here are some guidelines to help make that happen.

Demonstrate ethical behavior at all times and all levels. The statistical relationship between ethical behavior and a supplier's perception of trust with a customer is the strongest of any presented here. Ethics deal with questions related to the fairness, justness, rightness or wrongness of an action. They include the moral principles or values that guide behavior. Ethical behavior is a primary antecedent of trust and trust-based relationships. One certainty is that the risks of unethical behavior can be devastating to supplier-buyer relationships (not to mention possible legal ramifications). Ethical behavior contributes to greater trust, not the other way around, and relates to the integrity dimension of trust discussed earlier.

Say what you will do, do what you say. A basic principle

underlying trust and trustworthiness is that actions speak louder than words. Few things build trustworthiness better and faster than when words align with actions. Building trust is not about telling another party what they want to hear. Rather, it is about being open and honest in a manner that demonstrates confidence, consistency and predictability.

Create a corporate culture of trust-based relationships. Corporate culture refers to the philosophy, values and behavior that constitute the unique style and policies of a company. Executive leadership at the customer has the opportunity to create a culture that stresses the importance of trust-based relationships or they can create an environment that seeks to extract every concession possible from suppliers. Enlightened leadership at the customer will appreciate the linkage between trust-based relationships and preferential supplier treatment and convey the importance of this linkage throughout the organization. Making trust a central part of a corporate culture reflects a conscious decision, just as taking an adversarial approach with suppliers is a conscious decision.

Communicate, communicate, communicate. Interaction increases knowledge and understanding of the other party, which strengthens underlying trust. Frequency of communication (assuming the communication is constructive) has the potential to affect directly the trust that exists between parties. This highlights the role that negotiation plays within supplier-buyer relationships.

For instance, several suppliers participating in the survey complained that their customer replaced face-to-face meetings with electronic communication. While there is a time and place for electronic communication, these suppliers missed the new ideas and the give-and-take that resulted from direct interaction. Parties should welcome opportunities to communicate. When they do, the communication should be open, accurate, timely and complete.

Never discount the importance of individuals. The important role that individuals play within trust-based relationships is evident from the findings presented here. The supplier's perception of trust and trustworthiness depends directly on the ability of a customer's personnel to protect proprietary information, demonstrate competency, act ethically and engage in constructive communication. The bottom line is that hiring intelligent, ethical individuals to interact with suppliers, supported by the right culture, will go a long way toward promoting trust-based relationships.

Engage in trust-building activities. There are many ways to build greater trust between parties. These include: co-locating personnel to encourage direct and frequent contact; following through on promises and commitments; acting on the behalf of the relationship rather than narrow self-interests; publicizing success stories and personal narratives, particularly those that enhance the standing of the other party; and protecting the confidentiality of information gathered within the relationship. Two powerful ways to promote trust are to act both legally and ethically in all dealings and practice frequent and open communication. These tactics, each of which requires few resources, can have a disproportionate effect on the trust that exists between parties.

Understand what is important to suppliers and act accordingly. Industrial customers will find it useful to have an objective third-party assess the many aspects of their supplier-buyer relationships, including the supplier's perception of the trust that exists. Gaining insight into what is most important to suppliers increases the likelihood that a customer can direct behavior in ways that will provide the greatest return. While certain behaviors are obvious, other behaviors, depending on the setting, may be more nuanced. The challenge becomes one of replacing anecdotal or subjective analysis with an objective understanding of supplier needs and wants.

As we now know, any advantages that an industrial customer receives from a supplier links directly to the trust that exists between the parties. Carried to its highest level, preferential treatment can affect the buying dynamics of an entire industry.

However, the advantages of trust-based relationships are not something that appear on a financial statement or as an accounting line item. When all is said and done, it is ironic that something as seemingly intangible as trust affects so many things that are in fact quite tangible.

Yet, there is a clear linkage between trust, customer satisfaction, and the willingness of suppliers to provide preferential treatment to a customer. In fact, preferential treatment should represent the most sought-after outcome from trust-based relationships. And, it can be yours.

Capitalizing on the unexpected

Things don't always go as planned. New research sheds light on how procurement professionals can successfully manage the unexpected with their suppliers.

BY JENS ESSLINGER, LUTZ KAUFMANN, STEPHANIE ECKERD AND CRAIG R. CARTER

There's an old adage that no plan survives the first contact with the enemy. Or, as Mike Tyson famously put it before one of his prize fights: "Everyone has a plan 'till they get punched in the mouth." If there wasn't some truth to those adages, there wouldn't be Murphy's Law, a Plan B or bumper stickers with a colorful variant of the phrase "Stuff happens."

What's true in our everyday lives is also true in supply chain management. Supply chain organizations create plans for designing, making and delivering products, and their procurement teams contract with suppliers to deliver the goods. In the best relationships, suppliers enable their customers to bring new products, technologies and services to market before their peers. To that end, successfully managing buyer-supplier relationships has become vital in today's fast-paced business world, helping buying companies innovate and stay ahead in the competitive global marketplace.

But, just as Mike Tyson's opponents often found themselves on the canvas despite their best plans, the best supplier relationships sometimes are confronted with the unexpected —positive or negative events beyond the control of one party or both. When they do, not only must buyers deal with the resulting effects, which are a common cause of relationship stress, but they also miss out on opportunities for improvement. In a recent study, we set out to learn how these unknowns can affect the buyer-supplier relationship, and in so doing, provide some insight into how to create strategies to deal with them.

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It is obvious that maintaining positive relationships with suppliers provides a critical competitive advantage, but every relationship involves numerous complex and interacting factors. These may include a nebulous web of personal relationships, manager-to-manager communications, off-the-record deals and day-to-day crises. The difficulty in maintaining the vital connection between buyer and supplier given uncontrollable factors is especially pressing for chief procurement officers, who find their supply managers increasingly relying on trust to augment formal contracts when working with other companies.

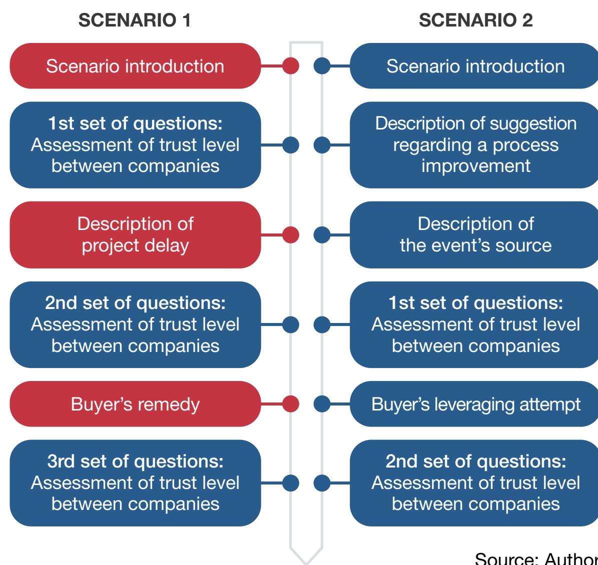
When it comes to managing buyer-supplier relationships, working to build long-term partnerships is important, but doing this and just hoping for the best is not enough. While much has been written about how to handle the passive and predictable aspects of a relationship, less has been dedicated to managing the chaotic factors. Experience tells us that these unforeseeable events can be just as consequential to a business partnership, but their inherent unpredictability can make it difficult to deal with them. How can managers best handle an unfavorable unexpected incident—like a project delay—in a way that reduces conflict? Similarly, how can they leverage a positive incident, like an unexpectedly valuable suggestion for process improvement? Are there any key factors that can be isolated and understood to help managers react to incidents in a way that will strengthen their businesses and relationships?

To answer those questions, we posed two online, scenario-based experiments involving approximately 1,000 experienced sales managers from various industry segments who had encountered similar situations before.

In the simulation, each subject acted as the sales manager for a supplier jointly developing a new product with the buyer. The subjects were told about the business relationship between the buyer and supplier, including information about interpersonal and informal connections. Once the scenarios were completed, we asked a series of questions so the subjects could assess changes in the business relationship between the buyer and supplier due to the unexpected incident for the scenario in question. Figure 1 provides an overview of the two scenarios. Our findings provide insights that we feel will be beneficial to those who manage buyer-supplier relationships and the events that influence them.

FIGURE 1

Scenario overview



Source: Author

Scenario No. 1: An unexpected negative incident

In the first scenario, 605 participants experienced a common negative incident: an unexpected R&D project delay. Before introducing the incident into the scenario, subjects received information about their relationships with the business in question, which was generally framed as being either cooperative or uncooperative in nature. Next, we asked them through a questionnaire to assess their baseline trust levels toward the buying company based on the information provided.

The participants were then informed about the unexpected project delay and asked to assess the trust level between companies a second time.

Finally, the participants received descriptions of the buying company's effort to remedy the situation. There were three possibilities: an apology, financial compensation or an offer to join the buyer's strategic supplier council. After reviewing the buyer's offer, the participants were asked a third time about their level of trust in the buyer.

Scenario No. 2: An unexpected positive incident

In the second scenario, 428 participants were provided information about a balanced—neither highly cooperative nor highly uncooperative—relationship with the buyer before any event. These participants then experienced an unexpected but favorable incident: a process improvement suggestion that enabled their company (the supplier) to reduce R&D costs. They also received information about the source of the event, with three possibilities: the buying company's R&D efforts; mutual exchanges between the buyer and the supplier; or an achievement of a member of the buyer's open innovation network. The participants were then asked to provide their assessment of the buyer-supplier relationship in terms of their perceived trust in the buying company.

Next, participants were told about the buyer's attempt to leverage the situation in one of two ways: by either requesting a one-time payment or demanding that the supplier explore similar process improvement opportunities for the buyer. After receiving this information, the participants were asked a second time to assess the relationship in terms of trust.

Follow-up interviews

After collecting our data, we conducted several follow-up interviews with purchasing managers and executives from different organizations with annual sales volumes ranging from $4 billion to $18 billion. These face-to-face interviews were conducted individually or in groups of two people and used to contextualize our experimental findings. The questions focused on several areas, including understanding the role that both business and personal relationships play in joint buyer-supplier projects, the types of incidents that managers experience, the ways they are communicated toward their counterparts and the mechanisms that managers use to remedy unfavorable incidents and leverage favorable ones.

Mitigating unfavorable incidents

Unfavorable incidents, such as unexpected project delays, shifting deadlines or budget cuts, can have severe consequences for buyer-supplier relationships. The results of our study showed that this negative impact was stronger when companies already had a cooperative business relationship. The stronger a company's existing ties to a partner, the more an unfavorable incident affected their trust levels.

A greater level of existing trust between buyer and supplier may mean more potential for damage to that trust, but strong interpersonal relationships between buyer and supplier managers can help in mitigating and repairing that damage.

While perhaps counterintuitive at first glance, this interaction makes sense when examined in more depth. Companies with cooperative business relationships have established norms and expectations along with financial and social obligations. The more familiarity and trust that exists in the relationship, the greater the potential for damage by a negative event, much as being let down by a close friend might hurt much more than if it were merely an acquaintance. This means that restoring trust between companies with strong cooperative relationships before negative incidents is even more important than we may have thought.

That said, our study also found a balancing effect: strong, well-developed interpersonal relationships can help mitigate the fallout from negative incidents. Healthy relationships between managers mean more potential for being understanding when things go wrong. They can also help people in both companies develop strategies to deal with similar incidents in the future. One executive in the raw materials business said: "If you have a strong personal relationship, you tend to help each other sooner. You have discussions about where you want to go, how you can work together and how you can get there."

The bottom line is that a greater level of existing trust between buyer and supplier may mean more potential for damage to that trust, but strong interpersonal relationships between buyer and supplier managers can help in mitigating and repairing that damage.

Make the best of a bad situation

The impact of the response to an incident can be as important as the incident itself. Managers in long-term business relationships may feel that they have proven themselves enough that responding to a problem with an apology is sufficient, but our findings show that simply apologizing can lead to a further deterioration in trust. Our scenario data indicated that the buying company had to offer the supplier a substantial benefit to compensate for the simulated project delay.

A favorable incident even compels the supplier toward sharing more knowledge with the buying company in the future, which can be invaluable.

According to one manager in the packaging business, it's important to keep the supplier motivated. "Appreciation comes first, but then you have to promise that there will be plenty of opportunities in the near future," the executive said. Specifically, our results indicated that suppliers responded more positively in the case of an unfavorable incident when they were offered financial rather than non-financial compensation, regardless of the prior state of the business relationship.

More interesting still, when offered financial compensation, previously uncooperative business relationships often improved to a level greater than what existed before the unfavorable incident occurred. These findings mean that successfully handling an unfavorable incident can actually improve the business relationship. Similar insights have been observed in the service domain: The so-called "recovery paradox" suggests that successfully handling unfavorable service situations can create enough trust to turn angry customers into ones happier and more loyal than customers who never experienced a problem at all.

Companies are often reluctant to react when a past business relationship has been uncooperative, but our study shows that inaction can mean squandering huge opportunities. "If you don't treat suppliers well, they won't offer you great ideas anymore, but rather give them to your competitors," one manager in the industrial manufacturing industry said. Regardless of the past relationship, offering a substantive benefit is the best way of protecting the future working relationship.

Favorable incidents/leveraging opportunities

While unfavorable incidents are more frequent, unexpected favorable incidents can be equally important. Unfortunately, many companies tend to focus on crisis management and disaster response, missing the opportunities represented by unexpected positives. A manager in the packaging industry we interviewed put it this way: "Good things frequently happen, although you tend to neglect them and only focus on the tricky ones."

Our findings indicated that favorable incidents can be used to create additional financial or non-financial benefits for the buying company. A favorable incident even compels the supplier toward sharing more knowledge with the buying company in the future, which can be invaluable. The executive in the raw materials industry we interviewed elaborated on this, telling us: "You can get important information about market trends. These are valuable and allow you to anticipate future developments."

Interestingly, the impact of a favorable incident was strongest when it was caused by a joint achievement of the two companies: The unexpected outcome was perceived more positively when both sides felt that they contributed to it. "It's always a joint project, for sure. It is not only our company or the supplier, but us working together with them to make this successful," a manager in the raw materials industry stated. This means that one can benefit from being gracious when developing healthy, long-term business relationships, even to the extent of giving a counterpart the perception of having contributed to a positive event—whether or not this was the case.

When good things happen

Given the importance of reacting to positive events, what is the best way of doing so? Our results suggest that suppliers seem to generally appreciate demands of non-financial benefits. For example, asking the supplier to explore similar process improvement opportunities for the buyer was even interpreted as a positive attempt to intensify the business relationship going forward. "The supplier helped us to optimize our portfolio," another manager in the packaging industry highlighted. On the other hand, suppliers responded negatively when they were asked to equally share the financial benefits that they were likely to realize from the favorable incident.

Finally, our findings indicate that the buying company's open innovation network also seemed to influence how managers perceive and respond to favorable incidents. "We get great ideas and insights from our innovation network. These can be generated in the most strange ways and are incredible and sometimes crazy," the manager in the packaging industry went on to say. Our results suggest that a supplier's interest in sharing its ideas with other network members in the future was higher when the favorable incident came from a member of the buyer's innovation network. "If you have a network of people providing ideas, you can maximize your company's capabilities," the manager in the industrial manufacturing business said. Highlighting the contributions coming from the buying company's innovation network is thus attractive when seeking to increase other companies' contributions to it.

Leveraging the unexpected

The longstanding approach to handling unknowns has been firefighting: quickly dealing with a negative incident to return the relationship to the status quo or feeling good about a positive incident and then getting back to business as usual. This is understandable in a fast-paced world where managers often don't have time to react to new situations.

However, our research clearly showed that unknowns play a much larger role in the buyer-supplier relationship than previously thought. Improper handling of negative and positive incidents can have long-term implications, damaging relationships or wasting opportunities for improvement. To that end, we have several broad recommendations (Table 1 provides a more in-depth summary of those recommendations).

First, managers must start by viewing unexpected delays and setbacks not as nuisances, but as opportunities. The research shows unequivocally that a successfully handled negative incident can improve a buyer-supplier relationship, sometimes resulting in a stronger bond than existed before the event.

Second, our research highlights how important it is for buying companies to manage the interpersonal aspects of their business relationships. Our study supports the notion that investing in interpersonal relationships can reduce the harmful consequences of an unfavorable incident. It is sometimes easy to forget about the personal aspects of business-to-business relationships, but neglecting them can hurt your bottom line.

Third, when encountering a favorable incident, our findings suggest that to create the best outcome, companies should highlight informational and non-financial exchanges between firms. They should also emphasize the contributions of network partners to strengthen business relationships across the network.

At the time it is occurring, an unfavorable incident may seem very different from a favorable one. But for the wise manager, both bring opportunities. In this respect, any unexpected incident should be seen as at least partially favorable, as it presents an opportunity to improve project outcomes or strengthen business relationships.

TABLE 1

Capitalizing on unexpected incidents in buyer-supplier exchanges

THE UNEXPECTED NEGATIVE

- Always respond, both to deal with the situation at hand and take advantage of opportunities that arise as a result of the event.
- Companies with strong cooperative relationships can suffer more from an unfavorable incident than those with weak ones, making restoring trust even more important.
- Healthy interpersonal relationships between managers can help soften the blow of an unfavorable incident and also encourage companies to develop strategies to deal with similar occurrences in the future.
- Make up for an unfavorable incident by offering your counterpart a substantive benefit. Simply apologizing is insufficient, even for established relationships, and may further deteriorate trust.
- Successfully handling an unfavorable incident can change the very nature of the business relationship for the better, forging a stronger bond than existed before.

THE UNEXPECTED POSITIVE

- Positive events can be leveraged to create additional financial or non-financial benefits.
- Never miss a chance to be gracious to the other side when developing a healthy, long-term business relationship. Highlight informational and non-financial exchanges between both firms to create the best outcome moving forward.
- Companies generally appreciate requests for non-financial benefits but respond negatively when asked to share the financial benefits they realize from a favorable incident.
- Highlight contributions from your innovation network to increase other companies' contributions to it.

Source: Author

Redefining the value from

END-TO-END INTEGRATION

BY STEVEN BOWEN AND MIKE BURNETTE

In the developed economies that emerged after World War II, business was centered on the mass production of low-cost, standardized goods to meet burgeoning consumer demand. Efficiency and scale ruled the day. Companies made massive investments far in advance of actual sales, focused narrowly on reducing in-house production costs and watched for opportunities to vertically integrate. Meanwhile, expanding consumer markets protected many manufacturers from the consequences of poor capacity and inventory planning. In that era of mass production, companies could simply afford to be less closely integrated with their supply chain partners.

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Of course, the economic, demographic and competitive environment in which we live today is dramatically different than the postwar period. Despite these differences, today's dominant business model still rests on the assumption that companies can operate within their four walls, taking orders as they come from customers, and expecting suppliers to ensure necessary material and service flows. Research has shown, and industry experience has vividly illustrated, when companies narrowly focus only on their slice of the value creation process—without considering the effects of their decisions on other parts of the supply chain—total supply chain performance suffers.

Lack of supply chain integration can be seen in misguided capacity plans, poorly calibrated production schedules, a cost imbalance for a given supplier, who may even end up out of business, buildup of excess inventory, inefficient use of logistics resources, poor customer service, lost revenues and ultimately diminished returns. And unlike before, companies today face sophisticated and dynamic consumer markets that brutally expose the problems associated with failing to have an end-to-end supply chain integration strategy. On the other hand, the benefits of supply chain integration through total value optimization (TVO) can be substantial, including:

- improving cost, reliability, inventory turns and cycle time at each activity node in the supply chain, while eliminating non-value time, work and other types of waste;
- providing supply chain partners with visibility to proactively identify issues and major cost savings that may have been difficult to see before;
- reducing average lead times and lead time variability;
- shrinking total order cycle time and supply chain cycle stock;
- Improving responsiveness and customer experience though more demand-driven supply chain operations;
- postponing buy, make and deliver activities until demand is better known, thereby reducing the costs of uncertainty;
- depending less on safety stock to manage variation; and
- entering markets that may have seemed too volatile under a traditional non-integrated supply chain.

Despite these benefits, end-to-end supply chain integration has proven to be one of the most difficult challenges that managers confront. Integration work is complex. It requires a significant investment of resources and a leadership team committed to the long-term growth of supply chain capabilities. Moreover, companies need to cut through the hype surrounding the latest integration fad and get down to proven best practices that industry leaders have used to transform their supply chains. All this leaves many organizations, even those that have moved toward organizational structures led by a single chief supply chain executive, asking: "Now that we are committed to supply chain integration, what do we do next?"

Research from the University of Tennessee's Global Supply Chain Institute provides some preliminary answers to that question. Field interviews were conducted with dozens of top supply chain managers who are leading their companies through the end-to-end supply chain integration journey. The goal was to discover best practices that could be applied in a wide range of industry contexts. Below, we discuss eight of these best practices. But first, one key insight of the interviews was that a major factor contributing to the challenge of integration is a lack of agreement on the very definition of what companies are trying to achieve, making a practical definition of supply chain integration a key factor in success.

Defining supply chain integration

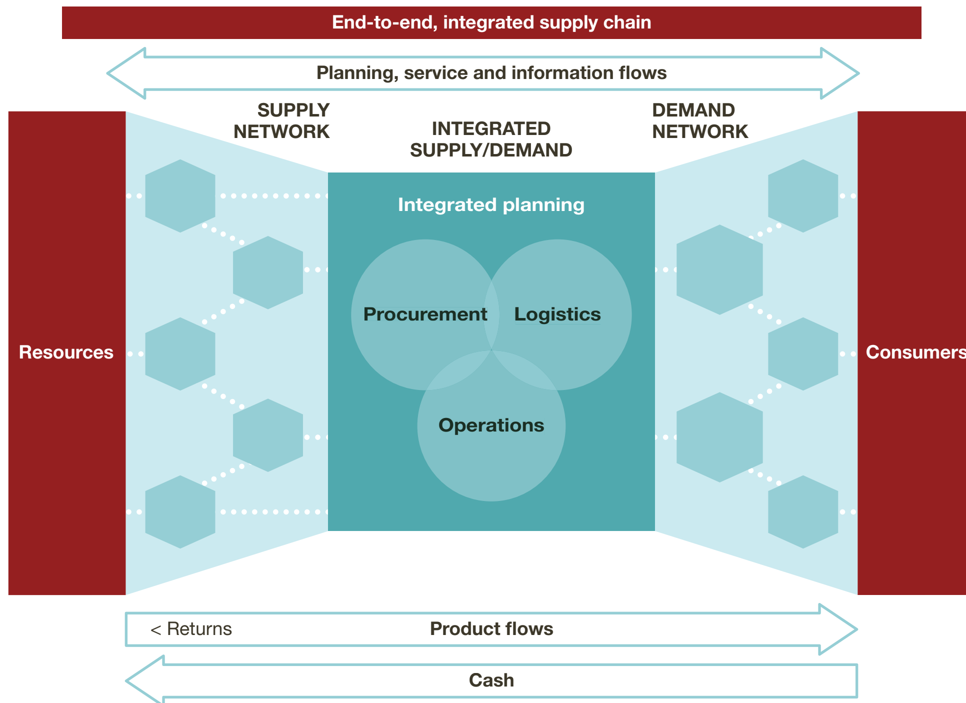
Research by Daniel Pellathy and Ted Stank, who contributed to this article, and Diane A. Mollenkopf and Chad W. Autry has defined supply chain integration as the process of connecting decisions and actions across an end-to-end supply chain (from supplier's supplier to the point of consumption) in order to drive total value for all stakeholders.

It requires aligning strategies, effectively managing operations and maintaining reciprocal flows of information among supply chain stakeholders to consistently optimize results for the entire supply chain. This means having a united and cohesive supply chain team within your company's four walls that includes not only the typical supply chain functions but also representatives from other major functional areas such as IT, finance and marketing. It also means working with external supply chain stakeholders to defined goals based on a common understanding of the total value being created. This strategy is the foundation of the TVO strategy.

This research has also shown that supply

FIGURE 1

Collaboration



Source: Authors

chain integration consists of the following three core elements.

Supply chain collaboration. The process of working with strategic partners to identify, define and pursue specific business opportunities that have the potential to increase overall supply chain value and to identify the role each stakeholder will play in achieving specific objectives.

End-to-end process management. Linking activities into a single, seamless process that supports supply chain value while considering the impact that increased customer service has on factors such as forecast accuracy, supply chain complexity, fulfillment cost and inventory levels.

Reciprocal flows of high-quality information. Collecting and storing data while using data analytics to provide real time information for leadership/management to improve decision making.

Supply chain integration typically occurs at both the strategic and operational levels. At the strategic level, integration starts with a clear and unified understanding of the value that each supply chain activity is meant to create for consumers and stakeholders. Once a clear understanding of each activity's contribution is achieved, strategic integration shifts to defining how each stakeholder will manage activities under their control and then holding partners responsible for their commitments. Operational integration occurs at the level of supply chain business processes, including customer relationship management, sales forecasting and demand management, production and operations management, purchasing and supply management, order fulfillment, resource management, new product development, end of product life and commercialization, reverse supply chain management and data management.

Operational integration forces partners to optimize the overall flow of supply chain activities, rather than simply executing activities along the different supply chain nodes.

Partners must also work to resolve conflicts in decision-making to ensure that the sequencing and timing of activities are matched with maximum efficiency. The goal is to create more streamlined and consistent supply chain operations that provide value to the stakeholders while generating a remarkable experience for customers.

The bottom line: End-to-end integration delivers supply chain and financial results

A high-tech solutions provider offering technologies and products in the global transportation industry had seen significant growth through acquisitions. As a result, the organization had an ecosystem of more than 1,500 suppliers, many with high cost bases. A lack of collaboration between leadership and cross-functional teams, not operating within an established new product introduction (NPI) process, an immature procurement function and poor visibility of the end-to-end supply chain led to time and budget overruns. To optimize the supply chain, the firm would need to kick-start a major transformation across the entire global business. This would require supply chain integration and collaboration, utilizing a total value optimization (TVO) strategy to achieve the desired results.

To achieve the vision of becoming an innovation-led manufacturer, the company's leadership sought to change the overall production footprint, streamline the NPI process and optimize procurement to be more strategic and forward thinking.

An initial analysis by Maine Pointe, a global supply chain and operations consulting firm, saw that the process of dealing with suppliers included only limited business rules and lacked accountability, with sales and engineering driving most of the supplier definitions. The global supply chain, which spanned two continents and five countries, did not have sufficient accountability built into the process.

The company's strategic vision was realized quickly by leveraging the TVO approach across the entire organization. Advanced data analytics was used to provide better visibility of the company's end-to-end supply chain. The transformation also introduced asset rationalization, sales and operations planning, new product introduction and leader and organization improvement.

Leadership was aligned around defined business rules, and a global, unified vision was identified, along with clearly defined roles and responsibilities across the organization. Higher-cost outsourcing operations in Canada and Germany were transferred to other relevant locations in the United States, Asia and Europe, in some cases moving to sourcing from outside suppliers. An initial focus on quick-win supplier negotiations led to new agreements, preferred pricing and incentives.

At the same time, a new procurement management operating system (PMOS) was identified to ensure a more sustainable supplier ecosystem and improved relationships.

Other improvements included enhanced customer service and operational efficiency, identification of relevant key performance indicators, and defining an NPI process model and playbook. Greater collaboration was achieved with development of a cross-functional sales, inventory and operations planning process across the entire organization, with buy-in from all areas.

The plan brought in a more strategic focus to sourcing, rationalized internal manufacturing facilities and established a greater level of accountability and collaboration through all phases of sales, inventory, operations and planning. The new approach also significantly reduced errors and improved supplier selection, securing the company's consistent future growth with a double-digit improvement in EBITDA as well as a meaningful reduction in global procurement spend.

These improvements in the supply chain, new sourcing relationships and business rules delivered results that went far beyond simple cost savings. Together with lasting EBITDA improvements, the transformation brought greater visibility and improvements to the end-to-end supply chain, improvements in operational performance, realistic KPIs and a more strategic sourcing operation that laid the groundwork for consistent future growth.

Best practice research

As part of our research, interviews were conducted with managers spanning the CPG, heavy equipment, food, automotive, chemical, packaging, retail and textile industries. The supply chain organization (procurement, planning, manufacturing, engineering, process, warehouse, transportation, etc.) in each of these companies reported to a single supply chain officer who was a member of the top leadership team and reported to the CEO. These organizational reporting structures helped to promote common vision, strategies, measures and priorities—but every manager we interviewed commented that internal organizational alignment realized only a fraction of the potential value that could be achieved through true supply chain integration.

The interviews revealed eight supply chain best practices that benchmark companies are using to drive value through integration. The following is a summary of those practices.

1. Jump-start supply chain integration with passionate top leadership. Top supply chain leadership must visibly

embrace and model integration work. This includes leading business processes such as demand/supply integration or S&OP, integrating new product development and launch processes and championing platform life cycle management. Leaders must also work across internal supply chain disciplines and between internal and external stakeholders.

2. Design a seamless supply chain team built to create total value. Benchmark companies organize their supply chains under a single supply chain leader who is a member of the corporate leadership team. In this way, the supply chain team is truly multi-disciplinary, with qualified representatives from all affected supply chain areas. This structure also enables the supply chain leader to act as a strong advocate for the value of integrated end-to-end supply chain systems. Supply chain integration is linked to business strategy and is viewed by business leaders as a critical tool for achieving enterprise goals.

3. Map the supply chain and then prioritize the biggest total value opportunities. Top companies flow chart supply chain activities across all suppliers, plants, warehouses and customers for all product lines. When done well, mapping the supply chain reveals areas where additional value can be created, beyond simple cost-cutting. A significant side benefit of mapping the supply chain is that the team also gains a far better understanding of the key drivers of overall supply chain performance.

4. Drive progress through a drumbeat of rigorous SC and business reviews. "You get what you measure" is a common business phrase. Benchmark companies take this idea to heart when it comes to supply chain integration. Leadership and team reviews are performed regularly within the supply chain and within multi-functional business forums.

5. Simplify, streamline and then integrate. Benchmark companies first simplify supply chain activities and then streamline and standardize work to avoid unnecessary integration work. For example, one of the benchmark companies we talked to focused first on standardizing equipment, materials and processes to streamline supply processes, and then leveraged these gains into improved customer service and responsiveness through better integration.

6. Partner to win—integrating customers, partners and suppliers. A company may not have the resources or brainpower to achieve end-to-end integration alone. Internal supply chain capabilities may not be sufficient to deliver on expanding business requirements. That's why involving customers, third-party providers (3PL, 4PL, contract manufacturer, engineering design firm, consultants) and suppliers in the integration process is critical to assembling the solutions and resources needed to complete integration work.

7. Integrate digital information systems enabling real-time end-to-end decision-making. An end-to-end integrated information system is required for end-to-end supply chain management. In the past, the cost and complexity of these systems limited their use to larger enterprises. But the digital revolution is eliminating these barriers. Benchmark companies modified their information systems to ensure that information was passed between critical nodes/transitions, and that information needed for planning, processing, and decision-making was real-time and accurate.

8. Create a new breed of holistic supply chain leaders. Benchmark companies have renewed their talent strategies to support their end-to-end supply chain integration strategies, shifting the leader's focus from optimizing their own department to driving end-to-end value. This shift requires leaders who can think broadly, work effectively across organizational boundaries, utilize new digital/Cloud-based tools, embrace change, continuously learn, think externally and react to the latest business requirements.

Driving value

The results of the benchmark company interviews demonstrate that true end-to-end supply chain integration goes well beyond appointing a single supply chain leader, developing an organizational chart that includes all of the supply chain disciplines or even creating a single supply chain scorecard. Benchmark supply chains drive value by verifying all activities and ensuring that transitions in the supply chain are integrated at both a strategic and activity level.

Is an end-to-end supply chain integration strategy right for your business? If you have complex, global supply chains, have multiple acquisitions, have significant customer service issues, or have a small pipeline of large cost savings projects, your supply chain is a prime candidate for this strategy.

Dan Pellathy, assistant professor of supply chain management at Grand Valley State University, and Ted Stank, professor of supply chain management and faculty director of the Global Supply Chain Institute at the University of Tennessee, contributed to this article.

How to Become a Supply Chain ROCK STAR

Supply chain leaders can learn a lot from rock and roll drummers

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

"So you want to be a rock and roll star
then listen now to what I say . . ."
— The Byrds

Think back to the first rock show you ever attended. Do you remember how you felt as the lights went out? For a moment you stood motionless in the dark, anticipating. Then the stage lights kicked in with a "bang," you heard the fog machines hiss and the band emerged from the shadows. The crowd—all 15,000 to 50,000—roared as the first guitar chords screamed through the speaker stacks seconds before the drums and bass dropped in. The show was under way.

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Did you imagine—if only for a moment—you were on the stage, singing lead, jamming on the guitar or riding the hi-hat? Most teenagers and 20-somethings do. The science behind the fantasy to find a place in the spotlight is clear. In adolescence, the brain begins to produce a neurochemical cocktail of oxytocin and dopamine that primes us to care deeply about social rewards. Maslow showed that those desires for belonging and recognition never go away. No matter our age, we derive our highest sense of self-worth from achieving our creative, intellectual and social potential. Standing in the shadows back stage simply isn't a substitute for being in the spotlight.

A tale of two drummers

Unless, of course, you're a supply chain manager. Too often, supply chain managers feel that they are stuck in the shadows, playing the drums behind the lead singer and guitar player. Even so, you may be wondering: "As a supply chain professional, what can I learn from youthful rock-and-roll fantasies?" Answer: We often forget that drummers are indispensable. After all, people at a concert dance to the drums, not to the vocals. Based on our 20-plus years working with supply chain leaders, we have learned that just as drummers deliver the beat that is the heart of every hit song, SCM delivers the value that is core to every supply chain competency.

To demonstrate our point, let's take a peek at how two elite drummers became rock stars as they helped their bands earn a place in the Rock & Roll Hall of Fame.

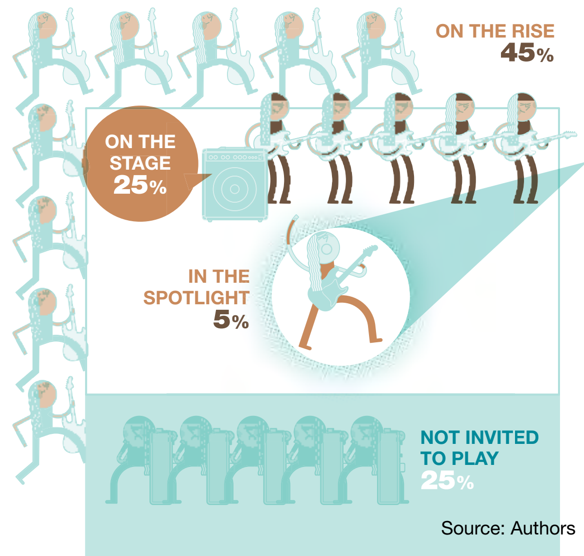
The steady beat with solo flair. Mick Fleetwood has anchored Fleetwood Mac, one of the best-selling rock bands of all time. Mick's playing is often restrained. Listen to "Go Your Own Way." You'll hear how Mick does the little stuff that pulls the band together and gives the hit its distinctive groove. His straight on-beat pushes the vocal track to the foreground at just the right time. Mick's skill with a pair of sticks reveals the genius of one of the best drummers ever.

Happy back stage, but ready for the spotlight. Dave Grohl, one of the nicest guys in rock and roll, earned his place in the Hall of Fame as the drummer for Nirvana. But, in a way, Dave's story began as Nirvana's ended. On April 8, 1994, Kurt Cobain, Nirvana's lead singer and guitarist was found dead at his Seattle home. Cobain's suicide stung deeply. Initially, Dave stopped listening to music. Eventually, he returned to music as a form of healing. Dave recorded the first Foo Fighters album in 1995, playing every instrument himself. The Foo Fighters, a band Rolling Stone called one of the greatest stadium acts of our time, have been on a roll ever since—with Dave on guitar and singing lead.

Mick and Dave have both reached the pinnacle of success. Mick did so by staying behind the drums, holding Fleetwood Mac's sound together for more than 50 years. Dave, by contrast, confronted the unexpected and stepped into the unknown, ultimately developing new talents and shaping a new sound. A close look at their contributions highlight five behaviors supply chain professionals can embrace to earn their place on the stage—and in the spotlight. These five behaviors comprise the Cycle of Credibility (see Figure 1). On a side note, Mick and Dave's careers also show that you can pursue more than one path to become a supply chain rock star.

FIGURE 1

The cycle of credibility



Source: Authors

A quick soundcheck

You may be thinking: "Back stage vs. the spotlight, you're kidding, right? At my company SCM isn't even on the stage, much less in the spotlight." We know where you're coming from and we have some good news. But first, let's do a quick soundcheck (see Figure 2). Over the past decade, we have worked with hundreds of companies,

including some headliner supply chain organizations worldwide. How do these companies stack up on the on-the-stage vs. in-the-spotlight metric?

FIGURE 2
A quick soundcheck

Source: Authors

- **In the spotlight.** In recent years, supply chain has been spotted rising up the charts as a need-to-listen-to voice. The spotlight, however, remains elusive. Only about 5% of companies invest in and rely on supply chain as the front-stage lead.
- **On the stage.** Supply chain's rise has put it on the stage at close to 25% of companies. Supply chain may not drive the sound, but these companies realize that the hits would stop coming without supply chain setting the cadence.
- **On the rise.** Greater operating risk and evolving business models mean that supply chain has left roadie status and is climbing onto the stage at almost 45% of companies. Just setting up and maintaining the equipment isn't enough; supply chain must deliver the goods.
- **Not invited to play.** Sadly, at about 25% of companies, Dave Grohl will be the next bad boy of rock and roll before supply chain steps foot on the big stage at show time.

Now, the good news: The behaviors you need to step into the spotlight are the same ones you need to get onto the stage. And if you find yourself at one of those stragglers that doesn't invite supply chain to the jam session, using the five behaviors will give you the credibility to audition for a more exciting supply chain gig. Simply put, regardless of where you stand in relationship to the stage, the Cycle of Credibility works. Let's take the Cycle for a spin.

The Cycle of Credibility

During a rock concert, a stage isn't just crowded; its chaotic. The band has one purpose: To rock the house. Tons of equipment must be properly set up to kick out the fog, put on a light show and, yes, crank out the volume. Don't forget, creating the right vibe requires turning out the stadium lights. On stage, it's dark—and it's loud. Communication is hard. Despite the daunting task, the band delivers a well rehearsed, but still spontaneous show. Let's take a closer look.

Eliminate the blame game. The stage is the band's supply chain—this is where value is created, reputation is earned and crowds are delighted. When the spotlights go on, the members of the band must be in synch, ready to rock. But, because musicians are humans and not machines, mistakes happen. Instruments malfunction; wrong notes are played. Great bands like Fleetwood Mac and Foo Fighters make it look easy. The audience doesn't notice the miscues; they are immersed in a seamless show. And the band does it night after night. How do they do it so consistently? The band sticks together. The players adapt in real time. They "edge out kinks" and they never stop playing—ever. They own their mistakes. The stage is not the place to point fingers.

Pointing fingers, however, is a sticking point in the business world. And, it erodes supply chain credibility. Consider two classic miscues.

1. **"Not they."** A few years back, Texas Instruments suffered a production mishap. An investigation ensued. The goal: Find the cause and fix it. Senior leaders reached out personally. They learned that the supply chain culture was out of tune. Everyone—up and down the supply chain—said: "It wasn't us." Managers pointed fingers saying: "They did it." Exasperated, a member of the leadership team printed up hundreds of "Not they" pins—enough for every team member. His message was: "It's time to own our mistakes. If we don't, we won't get better and as a company we will die."
2. **The GM Salute**. You may remember the General Motor's ignition fiasco: 2.6 million cars were affected and

124 people died. The official investigation pinned the defect not on the ignition switch but on GM's dysfunctional culture, calling out two decision-making behaviors.

- The "GM salute" describes managers crossing arms with fingers pointing outward toward others, denoting that the fault belongs to someone else, not me.
- The "GM nod" refers to participants in meetings nodding in agreement that action should be taken, but doing nothing.

Now you know why CEO Mary Barra likes to talk about the new GM.

The blame game is contagious—and it's toxic. Subtly, it takes over and undermines an organization's culture and its value-creation capabilities. Put an end to it.

But how? Mick Fleetwood knows the answer. For 50 years, as band members came and went, Mick consistently delivered the dependable beat that is the heart and soul of Fleetwood Mac's sound. A few companies—and managers—get it. Think Walmart and Sam Walton. Walmart started as a "five and dime," growing to the world's largest, most profitable retailer—a title it has held for over 30 years—by promising and delivering "always low prices." Sam Walton engendered a culture and built a logistics infrastructure to exceed customer expectations and control expenses. His goal: Lower the cost of living for the people of the world.

Lee Scott learned and applied this lesson well, owning mistakes, sharing successes and consistently delivering to promise. The result: As a Wall Street Journal headline noted, Scott was one of the first supply chain guys to rise through the ranks to become the CEO of a Fortune 100 company. Even after he stepped into the spotlight, Scott stuck to promises. Case in point: In 2005 Scott announced to the world that Walmart would become a leader in sustainability. Then the Great Recession struck. Many companies stepped away from sustainability goals. Walmart persisted. By 2012, Walmart introduced a product sustainability index, engaging suppliers to make sustainability affordable—a task that continues to befuddle most companies.

One final thought: Every executive we interviewed as we sought to decipher supply chain's quest to step into the spotlight pointed to the power of delivering to promise. Their stories were consistent: "Make your business case to get support. Then do what you said you would. Earn the paycheck by providing a return. The next time you need resources, getting them will be easier." Credibility with the C-suite emerges as you deliver results—not excuses. It also buys you some precious airtime—and you need to rock that air time.

Tell sticky stories

Great rock bands are master storytellers. They have to be. It's not easy to get signed by a record label. But, when a song connects it's not just timely, it's timeless. The lyrics, the sound doesn't just catch the ear, they stir the soul. After 40 years, people are still deeply moved when they hear a favorite cut from Fleetwood Mac's album *Rumours*. And people are willing to pay $150 or more to see the Foo Fighters live. Dave Grohl explains: "When you play a song like Everlong, so many people connect with it, that communal energy makes it magical, every night."

Intel, a Gartner supply chain exemplar, has long relied on sticky stories to create magic. Think back to 1989. Intel had launched its 386 chip, but it wasn't selling. Big box makers such as Compaq and IBM didn't feel a need to upgrade from Intel's 286 chip. Andy Grove, a master storyteller, decided to take the 386's magic, faster speed directly to consumers. The Red X campaign was released. Ads depicted a 286 crossed out by a spray-painted graffiti X. The message struck a chord. Almost overnight, consumers responded and the 386 became a smash hit. A simple story had enabled Intel to co-opt power in the PC supply chain. You may have never heard of Intel's Red X campaign, but you certainly recognize its successor: *Intel Inside*, which is often accompanied by Intel's five-note chime (D flat, D flat, G flat, D flat, A flat).

Regrettably, supply chain managers aren't known for their sticky stories. They create neither energy nor magic as they dwell on costs and capacity. They don't get that their audience longs to hear a different story. Being tone deaf, they fail to connect. The executives we spoke with reiterated this point—that "*we simply don't connect*"—and identified a supply chain priority: "CFOs and other members of the C-suite aren't going to learn to speak supply chain. It's on *supply chain* to learn to speak their language." Dave Grohl offers a hint here: "Don't bore us, get to the chorus." To the C-suite, that means get to the P&L impact. Craft your conversations with a common refrain from Intel in mind: "If you don't have the numbers, it's just your opinion." Beat the drums on how

each decision, each investment and each risk will affect revenue growth, profits and continuity.

And don't forget, the C-suite wants to hear it in three minutes and five seconds (the magic length of radio hit singles).

Don't just be bearers of bad news

When you think of the off-stage antics of rock stars, what comes to mind? Perhaps you think of Van Halen's David Lee Roth trashing dressing rooms, kicking holes in doors and causing thousands of dollars of damage. Maybe you remember The Who's Keith Moon smashing instruments, blowing up hotel room toilets and setting furniture on fire. Moon actually passed out in the middle of a concert. Pete Townsend stepped up to the mic and asked: "Can anyone play the drums? I mean somebody good?" You get the idea. Rock stars are known for being a pain to deal with. Compare this to Dave Grohl's reputation as a legitimate good guy. In fact, citing his propensity to stop fights, settle feuds, donate to charity, invite fans onstage (or play sets in their garages) and cook barbeques for firefighters and food banks, *Planet Rock* called Dave the "undisputed nicest guy in rock."

Supply chain typically avoids the prima donna label, but many perceive supply chain to be a pain. The executives we interviewed noted, with a hint of dismay: "Think about it, at many companies, the only time the C-suite hears about or touches supply chain is when something goes wrong. Supply chain is a bearer of bad news." Imagine Elon Musk's angst when his dream of bringing stylish electric cars to the mass market was sidelined by what he called "production hell." If you read the *Wall Street Journal*, looking for the bad news, what will you find? Only rarely is financial malfeasance or a marketing mishap reported. Supply chain, by contrast, is a frequent, unfortunate headliner. Table 1 highlights some classic supply chain misses side-by-side with a few glitches that were publicized in just one week in January 2019. With all the bad press, it is no surprise that supply chain comes across as the bad boy of business.

The executives we talked with called on supply chain leaders to rehabilitate supply chain's reputation by proactively sharing the good news—and maybe saving the day once in a while. Dave Grohl knows how this works. When Jared Champion, the drummer for Cage the Elephant, suffered a burst appendix, Dave sat in. Guitarist Lincoln Parish marveled: "I had to pinch myself. I turned around and Dave Grohl is playing the drums. It's an amazing, once-in-a-lifetime experience." Consider Sony de Mexico's story. Disaster struck in the form of a pink slip. Lower costs in Asia led management back in Japan to decide to shutter the Mexican operations. In this case, supply chain did save the day. Managers built a new robust delivery model that reduced delivery lead times by 75%—and internal inventory costs by 80%. More importantly, Asian operations couldn't match the delivery responsiveness. Customers lined up to argue the reasons that Sony couldn't leave Mexico.

TABLE 1

Bearers of bad news

Source: Authors

Saving the day doesn't always require on-stage heroics. Sometimes, it can be as easy as re-sourcing a product. McDonalds did just that as Russia-U.S. relations soured in 2018. Pro-Kremlin authorities wanted to kick McDonalds out. By increasing the share of local Russian purchases to 98%, McDonalds proved its worth, placated the politicians and claimed a realpolitik success story.

Say yes

In 2015, Dave Grohl and the Foo Fighters received an unconventional—you might say unreasonable—request. One thousand rockers had gathered in Cesena, a small Italian city of 97,000, to record a live performance of the Foo Fighter's song, Learn to Fly. At the end of the video, Fabio Affagnini, the event organizer, shared his dream that the Foo Fighters would give a concert in Cesena. The video went viral. Friends called Dave and asked: "Have you seen …?" The band tweeted: "Ci vediamo a presto, Cesena" (See you soon, Cesena). Later that year, the Foo Fighters performed to promise, playing a 27-song set in Cesena.

Now, a question: Are you aware that top executives everywhere use a never-published metric we call the "we-can-do-that" metric? The metric works like this. Colleagues request your support for their ideas and projects. You may feel that a request is situated somewhere between "that's highly inconvenient" and "that's impossible" on the do-ability scale. So, you politely say: "that's impossible" or "we can't do that, nobody can." Sounds reasonable, right? The thought leaders we spoke with warned that such a response used too often tarnishes your reputation. The result: Supply chain can easily be viewed as a bottleneck—a place where managers obsess about costs and won't take risks. Our thought leaders argued that supply chain needs to learn the art of the possible by saying "yes" with a twist. Here are their recommended responses.

- "Yes, we can do that. Let's talk about what that means in terms of cost and performance." As the conversation concludes, expectations have been set, tradeoffs are on the table and you can ask: "How would you like to proceed?"
- "Here's what we can do. Would this meet your needs?"
- "What are you really trying to achieve? Let's find a way to work on a solution together."

To better grasp the power of saying "yes" with a twist, let's take a quick look at how two rivals in the airframe industry handled the supply chain challenges of a major product launch.

Squandering a lead. At Boeing, supply chain leaders said: "No, that can't be done" when the C-suite proposed a shared development and production model. Rather than asking: "What will that mean for our ability to deliver the plane on time?" they argued that follow-on supply chain costs would skyrocket. Supply chain's "no" response didn't have the clout to carry the day. The 787 came to market 3.5 years late and $20 billion over budget.

Playing catch-up. At Airbus, everyone knew that Boeing's 787 was selling lights out. Airbus needed to get its version of a fuel-sipping carbon-fiber plane to the market. Supply chain leaders stepped away from their cost orientation, asking: "What do we really need to achieve?" Speed and safety to market was everything. Despite high cots, Airbus supply chain worked with Orbital ATK and Crane Logistics to design a launch supply chain to get production up and running ASAP—and planes in the air.

Saying "yes" with a twist doesn't just enhance performance, it elevates reputations—and it is a behavior that can help supply chain learn to fly.

Ask "what if?"

The story goes that back in Dave's days as Nirvana's drummer, the band's dynamics were, let's say, a little limiting. Speaking of that earlier time, Dave shared the famous joke.

Question: What was the last thing the drummer said before he got kicked out of the band?

Answer: Hey guys, I've got some songs I think we should play.

After Cobain's suicide, Dave had options. Invites to join established bands came streaming in. Dave turned them all down. When he was ready to return to music, he turned to a notebook full of songs he had secretly penned. He chose 15 and booked some studio time. Playing every instrument himself and singing the vocals, Dave put together a demo album. He titled it *Foo Fighters* and shared it with some friends. The album got out, ending up in the hands of record label execs. Suddenly, Dave needed a band. Almost accidentally, the Foo Fighters had arrived on the scene. Why had Dave been so reticent to step out into the spotlight?

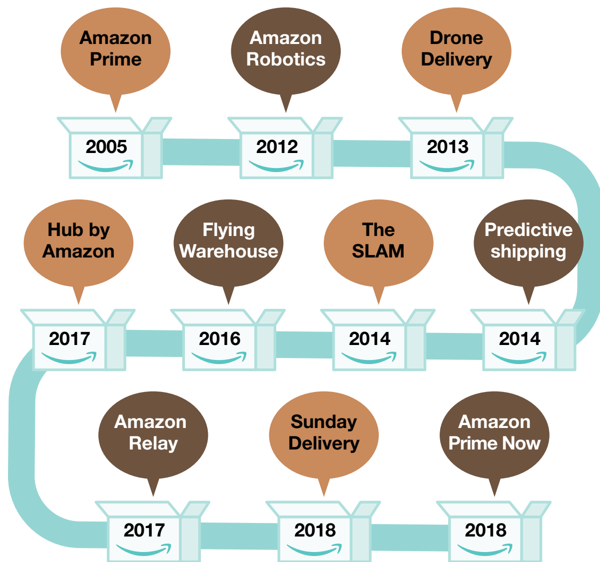
Dave's answer: "I didn't like my voice, I didn't think I was a songwriter, and I was in a band with one of the greatest songwriters of our generation. *I didn't really want to rock the boat*." Many supply chain managers feel the same way. They jot down their best ideas—a new product concept here; a process improvement there. But

they, like Dave, keep their ideas to themselves. In fact, we estimate that someone in the organization already has the answer for 90% of the problems companies hire consultants to solve. The thought leaders we spoke with identified three reasons why supply chain managers hold back:

- they sense that ideas from backstage aren't welcome;
- they are too busy putting out the day-to-day fires that define SCM; and
- the busyness is an easy excuse to stay backstage in the comfort zone.

TABLE 2

Amazon's anticipated out-of-the-box logistics solutions



Source: Authors

Thought leaders accepted that culture and the chaos of day-to-day supply chain operations can indeed make sharing hard. They expressed dismay, however, that many supply chain managers aren't rocking the boat more often by anticipating needs and offering new, creative alternatives. They explained that asking "how can I help?" is not nearly as cool as asking "what if?" What if, for instance, Dave hadn't booked that studio? More to our point, what if, like Dave, supply chain leaders accepted the risk of stepping into the spotlight with their best ideas?

Amazon provides an answer. Amazon changed consumer behavior and expectations as logistics leaders dared to step into the spotlight and ask, "What if?" Go back to Amazon Prime. The idea was new, but the team was confident, saying, "We never thought it wasn't going to work. This was one experiment we knew we were going to make work—failure was not an option." Over a decade later, getting out in front of the market is the rule, not the exception, at Amazon. No one is surprised anymore when Amazon publicly anticipates a new, out-of-the-box logistics solution (see Table 2). Amazon's ability to anticipate the future is as common as a Foo Fighter hit song.

Setting the cadence for the 21st century

Like all cycles, the Cycle of Credibility takes you back to performing to promise. The cycle isn't just about getting onto the stage and stepping into the spotlight—the neuro-chemically induced fantasies of adolescence. It's about boosting your career and changing the world. The Cycle of Credibility is all about your professional dream of doing something incredibly cool while you share the spotlight. This just happens to be the proven path to the top of Maslow's hierarchy.

As we close our set, don't forget that Mick and Dave made it to the top of the charts by doing the right things their own way. Mick mastered the drums, delivering the groove that inspired a multi-generational love for rock and roll. Dave earned confidence at the drums, a confidence that helped him step into the spotlight. He and the Foo Fighters have been creating a new sound ever since, shaping a new generation's passion for rock and roll. If you're wondering which way to go, Dave's story may strike the better chord for 21st century SCM.

What do we mean? The world is changing. Industry 4.0 is disrupting the way business gets done. It's anyone's guess what the next act will be. The question is: Who is going to set the cadence? Why not you—the confident, competent supply chain professional? And if you're not quite ready, just jump onto the Cycle of Credibility and give it a spin.

Trust the process, take confidence in your progress and remember Dave's advice to every struggling drummer: "Everyone thinks you're dumb. What they don't realize is, if it weren't for you, their band would suck." Yesterday's gone. It's time to turn it to 11; we'll count you in.

Automate bidding to manage tight capacity

Q&A with **Brian Thompson,** Chief Commercial Officer, SMC³

Q: What are SMC³ customers saying about the current state of the LTL market?

A: Early in the year, many of our less-than-truckload customers noted temporary easing in capacity, and there were quite a few shippers and 3PLs conducting bid events. Shippers who had been taking a wait-and-see approach to rate fluctuations, and in some cases even declined to re-bid their freight in 2018, re-entered the market. They were seeking to engage additional providers, secure better service and test market rates.

Capacity is projected to tighten later in the year. With the departure of New England Motor Freight from the market, a dearth of capacity will likely be the status quo moving forward. This is especially true in the Northeast, where NEMF was a major player.

While tight capacity can lead to shipping headaches, savvy customers that truly collaborate with carrier partners and have a strategic sourcing plan will be able to weather future capacity issues.

Q: How do shippers manage capacity in the current market?

A: At the start of every year, shippers should always review their carrier options and make sure they benefit from the optimal mix of carriers. The best procurement solutions help shippers navigate the sourcing environment by automating the entire RFP process with seamless integration to existing systems.

SMC³ is a neutral third party, and we engineer solutions for the good of the entire supply chain, helping logistics companies optimize their business. One of those solutions is Bid$ense, a cloud-based tool for transportation sourcing that allows shippers and 3PLs to cultivate lasting, worthwhile relationships with more than 500 carriers.

Q: Can bid technology truly help carriers, shippers and 3PLs alike?

A: Shippers who automate their RFPs are able to process bid responses from more than 30 carriers, on average, a scope that would be impractical if using manual processes. While this wider net can lead to savings for shippers, Bid$ense also helps shippers manage and cultivate these new business relationships.

In order for carriers to offer their most competitive price, they must have confidence in the volume and characteristics of the business out to bid. Carriers understand that Bid$ense data is clean, complete and detailed down to the shipment level, so they have a complete picture of the freight. The superior quality of the data communicated to carriers allows them to quickly select the freight that's a strategic fit for their networks, sharpening their pencils to attract freight that fits with their business model. Both carriers and shippers win when supply is closely matched with demand and carriers can allocate capacity where it's truly needed. The end result of using bid automation is more efficiency in network planning for the carriers, which results in lower rates and better service for shippers.

Mobile robots are on the move

Q&A with **Jerome Dubois,** Co-CEO, 6 River Systems

Q: Why mobile collaborative robots in fulfillment, and why now?

A: There are two factors at play: a clear business incentive to accelerate the use of automation within fulfillment, and the availability of technology to meet that need.

The first - the business incentive - is driven by the need to address the labor shortage within the industry. The way to do that is not by cloning warehouse associates, but by empowering them with automation to work faster and more accurately. Collaborative robots make the job easier to perform, allowing management to get more out of their existing operations.

The availability and affordability of the underlying technology that powers collaborative robots is also a big driver of "why now." Autonomous car technology, cloud computing, artificial intelligence and machine learning software allow providers like us to drive down the cost to develop and increase the performance of solutions. Meanwhile, operators are looking for alternatives to traditional automation projects, which, historically, are lengthy, expensive and complicated undertakings that rarely fulfill business case promises. We are now at a tipping point where customers can realize a sub 1-year payback on investments in collaborative robotics.

Q: What kinds of applications are best suited for collaborative robots?

A: Anywhere with each picking into a box or tote is a good application for collaborative robotics. Our customers include some of the top 3PLs, e-commerce retail and manufacturing operations in the world. Industries also include aerospace, medical/surgical device, nutritional supplements, footwear, cosmetics, computers and electronics, service parts and more.

Q: How easy is it to integrate and implement collaborative robots?

A: Systems like ours integrate seamlessly with warehouse management systems (WMS) and can be deployed in less than a month. That's because we only need pick level data and don't need to own or manage inventory. No new infrastructure is required, which speeds up deployment and further decreases complexity.

Q: What kind of productivity improvements can I expect?

A: On the conservative side, collaborative robots can double your pick rates. Pick rates using manual carts with paper tickets are around 50 to 80 lines per hour (LPH). 6 River Systems can boost productivity to 120+ LPH. In addition to pick rate improvements, collaborative robots help provide a safer work environment for associates.

Q: How do associates like working with robots?

A: They enjoy it because the robots take over the grittier parts of their jobs. Robots autonomously travel to and from pick locations, carrying up to 160 lbs. of items. They guide associates through the maze of aisles to the right pick locations and even show product images to make it easy to identify products. Associates can be fully trained on robots in a matter of minutes.

Four emerging supply chain trends for 2019

As supply chains evolve, companies are re-evaluating their networks to determine how their future supply chains should be structured.

By Michael Zimmerman, Robert Wang, Brendan See and Shrimant Jaruhar

Supply chains around the world are being transformed. External pressures, technology trends and internal evolution are prompting companies to reevaluate their networks to determine how their future supply chains should be structured, both in terms of capacity and capabilities. What should you do now? A good first step is to consider the broad ongoing trends that will affect the supply chain of the future. These can be grouped into four main categories. Let's take a look at each in more depth.

Michael Zimmerman leads the Analytics Practice for the Americas region. Robert Wang is a manager at A.T. Kearney. Brendan See is a senior manager at A.T. Kearney. Shrimant Jaruhar is a senior associate at A.T. Kearney.

Emerging technologies. Drones, autonomous intelligence and robotic automation will eventually transform warehousing and transportation, which will create networks that may look and operate very differently from those of today.

Focus on supply chain visibility. The Internet of Things, Big Data and data transparency will improve organizations' abilities to gain visibility on the real-time status of their supply chain networks, thus giving them the ability to not only rapidly respond to problems but more importantly, anticipate and prevent them more effectively. Data abundance will be used to draw insights on both short-term and long-term improvements to the supply chain and beyond.

Sharing economy. On demand warehousing and on-demand logistics will allow organizations to be more flexible in how they operate their supply chains. Lower Capex and higher adaptability will likely be attractive for organizations that are in rapidly evolving industries.

Evolving customer channels. There is an ongoing shift away from traditional retail to direct-to-consumer shipping. Consider that 40% of brands now sell directly to the consumer, and that those DTC sales are projected to reach $130 billion by 2025—this requires a supply chain with different capabilities than those in place today.

Measure impact on existing supply chain

With these broad trends in mind, organizations must constantly track select metrics like warehouse utilization levels, actual customer service level, cost to serve/profitability of product categories and use of stop-gap measures to determine if there is an ongoing impact on revenue growth and operating margin.

It is important to ensure that operations track and have visibility on these metrics across the supply chain because these metrics will provide an indication that negative business impacts may be imminent. Operations should not only track and generate reports on the metrics, but should also have the channels to communicate the resulting impacts to the business to the C-suite.

Sales and operations planning (S&OP) is a crucial initiative that many leading organizations are implementing to ensure even wider visibility on customer impact. The next evolutionary step in S&OP is to leverage real-time visibility to better align on expected and incoming demand, which equips the organization to shape and serve that demand.

These metrics must be monitored often to plan necessary changes to the supply chain, as the

lead-time to these changes could range from a few weeks to several years based on the level of network upgrades needed.

Determine gap in the business strategy

Before any supply chain redesign, it is crucial to determine if the company's business strategy can be supported by the existing supply chain network. Based on how the company is oriented—whether it is service oriented, cost oriented or a hybrid of both—the existing supply chain network could be out of sync with the business strategy. If the company has recently gone through a strategic transformation, it is crucial to capture the impacts of the new strategic direction on the supply chain. Even better, make supply chain redesign part of the strategic transformation because the supply chain is a strategic enabler.

Consider factors affecting supply chain design

Examining the external trends, measuring key supply chain metrics and evaluating the network against the business strategy usually determines that the supply chain requires some, or even major, overhaul. The following four main factors need to be delved into further.

Factor 1: The existing supply chain. Warehousing, transportation and business impact metrics will reflect the current state of the existing supply chain. To develop a new network, it is important to establish the baseline of existing capacity and capabilities. That necessitates a thorough study of the network, with site visits to discuss existing problems and projected challenges. Apart from determining capacity, an important aspect of this baselining exercise is to map out the technological capabilities of the network. With new WMS, TMS and automation technologies available, it is crucial to compare current state capabilities against these technologies to determine the gap and business impact.

After baselining, the organization will have to determine future volume and project when and where the network will be at capacity. If required, the previously mentioned site visits can also help determine opportunities to push expansion/reconfiguration through quick win solutions. External best practices should also be evaluated to determine other implementable quick wins to relieve capacity constraints in the short-term.

Factor 2: Product, customer and channel. Understand how customer demand is changing by understanding the marketplace. In Consumer Packaged Goods (CPG), for example, DTC, a channel where companies sell directly to customers rather than through intermediate retail outlets, is booming. Unilever, for instance, acquired the Dollar Shave Club while at Nike, DTC accounted for 70% of growth in 2017. Evolving customers will result in changing channel and product preferences. It is important to determine how flexible the current warehousing and transportation infrastructure is to be able to serve the evolving customer and product mix. If significant changes are required to the supply chain, the organization must plan out both short-term strategies to meet customer needs and a long-term plan that is flexible enough to adjust to changing customer needs.

Factor 3: Organizational capacity and capability. The organization's capacity to support a future-state network must be taken into consideration as any ideal theoretical supply chain will remain just that without the organization having the following capacities:

Data and analytics. To design a supply chain for the future, it is important to plug any data gaps, including knowing supplier and customer location, customer forecasts, transportation costs and realized raw and adjusted service levels, among other key inputs. The firm should be able to trust the data being reported and be able to access it readily to perform the required analytics.

Financial strength. The organization's appetite for financial investments in the supply chain must be identified. Often supply chain spend is seen as a cost of doing business but the C-suite may occasionally demand a financial return on the investments. The business impact metrics mentioned previously can be useful to make this business case, if required. Additionally, it is good practice to re-design for phased Capex spend regardless of whether the firm has been investing regularly in their supply chain. This not only spreads the investments over years but also allows for certain metrics to be achieved before further investments are required. An alternative to building-to-own would be leasing warehouse space (DC Capabilities), as the marketplace evolves to ensure flexibility in business strategy execution while keeping Capex spend low. With the booming sharing economy, the lease option could become increasingly attractive even at the cost of higher Opex.

Design process expertise. The organization must have the expertise to build an optimized model, run scenarios and objectively assess tradeoffs. Either through internal or external experts, the organization must have the ability to gather baseline data, model the network and its intricacies, determine scenarios to run, and be able to bubble those up to operations, sales and the C-suite to make actionable decisions.

Implementation process expertise. The organization needs the expertise to refine the network design based on what is implementable. These should ideally be the same individuals who can lead the execution of the new network, also

building the new capabilities the supply chain needs.

Communications. Build internal consensus and manage change for the success of the project. Sensitivities around workforce consolidation, speculation around timing and fluidity of the decision require the right structure and communications protocol to ensure morale is sustained while avoiding PR disasters.

Factor 4: Execute the supply chain re-design process. Once it is determined that the organization can implement a new supply chain network, the re-design process, at a high-level, should follow these 10 steps:

1. Conduct further site visits and talk to sales and operations to understand capacity and capability gaps. Thereafter, interview all stakeholders in and outside the supply chain for pain points and gaps.
2. Model the network baseline.
3. Refine the baseline supply chain model through internal data collection and analysis to ensure that the current state is accurately captured before any redesign is undertaken.
4. Project future volume for various scenarios.
5. Using real options pricing methodology (i.e. mapping different probability weighted projected outcomes based on different input assumptions), determine the ability to serve future volume and the resulting financial implications.
6. Design the best greenfield network for the business strategy and customer requirements.
7. Compare with the existing network and design a realistic network that fully utilizes existing assets by modeling additional capacity and capabilities and determining associated Capex and Opex costs. Involve the supply market and their assets as inputs into the network design.
8. Discuss with all stakeholders and determine if the financial and strategic implications of the new network are worth the costs.
9. Develop a phased implementation plan and add trigger points to enable flexibility in responding to trends and volumes.
10. Develop the messaging and communications protocol to ensure smooth execution.

The emergence of new technologies will fundamentally change supply chains across industries, and executives need to anticipate these changes to remain competitive and deliver value.

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SUPPLYCHAIN MANAGEMENT REVIEW

Quarterly Transportation MARKET UPDATE

LTL: Can the market revival continue?

Drivers are scarce, costs are way up and rate increases will largely fall on those shippers that don't unclog their supply chains in this "good, not great" market.

BY **JOHN D. SCHULZ**, CONTRIBUTING EDITOR

The $38 billion less-than-truckload (LTL) sector—considered moribund a decade ago due to high internal fixed costs and changing shipper demands—has been on a four-year roll.

As Wolfe Research trucking analyst Scott Group recently noted: "LTLs have lots of operating leverage." Other trucking analysts say that despite signs of a slowdown caused by tariffs and threats of trade wars, the LTL sector as a whole has outperformed its truckload competitors over the past two years in its ability to control costs, get rate increases and drive efficiencies in shippers' supply chains.

Still, some leading LTL executives are disclosing to *SCMR* that freight has slowed since its all-time peak of last summer—but of course, first quarter seasonality always drives down freight levels this time of year.

"Current conditions are good, not great," says Chuck Hammel, president of Pitt Ohio. "December was a good month, but business levels have certainly leveled off from the highs in the summer. With that said, capacity is still tight."

Taking advantage of a reviving domestic industrial economy and tight capacity caused by significant barriers to entry in the LTL market, carriers have increasingly been shrewd in driving down their costs and getting compensated for its costly hub-and-spoke networks. Those systems require significantly more capital and personnel than the simple point-to-point moves by most TL carriers.

Satish Jindel, principal of SJ Consulting, an analyst firm that closely tracks the LTL sector, is predicting another above-average year for the LTL sector. He's predicting overall rate increases averaging in the "mid-to-high single digits," but cautions that not all shippers will be seeing the same rate hikes.

"There will be capacity and demand variations week to week depending on seasonality and other factors," says Jindel. "If you smooth out all of that, I expect 2019 to be a another good year for carriers."

Shippers shouldn't feel that transportation costs have to go up, Jindel adds. "If there are any shippers out there who say that they have no way to lower their costs, have them call me. There isn't a single shipper who can't take cost out of the system."

Over the next few pages we take our annual deep dive into what's driving improved LTL efficiencies as well as how various cost increases are adding up for carriers. We'll also examine how shippers can mitigate those rate hikes through shrewd management of their supply chains and carrier relations.

All costs going up

For decades, LTL carriers were largely insulated from the driver shortage because LTLs and their networks offered a more attractive lifestyle—home every night, or every other night—with little freight unloading duties. However, the driver shortage has finally caught up to the sector.

"The driver situation has not changed much, and it's still difficult to find experienced and safe drivers," say's Hammel. "Driver pay has gone way up, with most companies just trying to hold their existing drivers and minimize turnover. As an industry, we need to do a better job of attracting new drivers just to keep up with the demand. In order to do that, driver costs will need to go even higher."

Besides increased driver costs, new safety features are driving up equipment costs, turnpike tolls continue to increase substantially, while increasing technology demands and traffic congestion are causing carriers to waste time and place more trucks in operation to meet just-in-time inventory demands.

One small break in the clouds is that the price of diesel is down. However, most LTL executives labeled that a "non-event" because the weekly surcharge moves up and down with the price of fuel and has little effect on a carrier's bottom line.

"At the end of the day," adds Hammel, "my biggest cost concern is everyone's biggest cost concern: health care."

The YRC factor

Perhaps the most sensitive issue in the LTL industry—and the one industry executives are always privately buzzing about—is the fate of the Teamsters' ongoing talks with YRC Worldwide, a company that controls the 4th and 8th largest units in the LTL sector with its

long-haul YRC Freight and regional subsidiaries.

First, there's little chance of any strike or work stoppage; however, YRC's contract with 24,000 unionized workers will nevertheless have serious ripples within the sector due to its sheer size—controlling about 20% of the LTL market.

Already, rival carriers say they're winning some business from shippers skittish of any work disruption at YRC. "Uncertainty at YRCW could lead to share gains for other LTLs," says Group of Wolfe Research. "The key question in our mind is if LTL pricing will stay rationale if YRCW starts to cede share more meaningfully?"

There's no way of knowing until James P. "Jim" Hoffa and YRC negotiators hammer out a final deal. However, YRC rank and file have been operating under a 15% wage giveback and a 75% cut in the company's pension contributions since the 2009 downturn. And it's no secret that YRC workers would like to be "made whole" again.

But whether YRC is on firm enough financial footing is still up for question. In fact, YRC is barely profitable. It recently posted consolidated operating income of $22.1 million on $1.2 billion in revenue for fourth quarter. That operating income also included a $3.6 million gain on property disposals.

Still, rival carrier executives are watching YRC's talks closely. "If they do something that's not in line with the industry, that's going to hurt the rest of us," one trucking executive said privately. "A Teamster job is not what it used to be—the best job in the industry. They have some problems that could affect the rest of us."

Pricing picture

Most forecasters and company executives are forecasting LTL contractual rate increases of between 4% and 6%. However, that's like saying the average temperature in the United States today will be 55 degrees—there will be much higher temperatures in Florida than in, say, Maine.

The sudden bankruptcy of New England Motor Freight, once the 17th-largest LTL carrier, will crimp capacity in the Northeast for sure, rival carriers say.

"Pricing has leveled off somewhat," Pitt Ohio's Hammel said before the NEMF news. "We're still looking to get around a 4% to 6% increase on average, but if a customer can work with us to lower our cost of doing business then we can adjust their increase lower."

Analyst Jindel, who's happy to hear Hammel's pledge, adds that carriers are being financially punished because too many shippers continue their inefficient shipping habits. "One simple thing that drives me up a wall is when carriers complain that shippers don't have enough dock doors at their facility," Jindel said. "A trucker should have a dock door when he pulls up to a facility—no exceptions."

For those shippers who don't and, in turn, cause carriers to lose valuable on-duty time waiting at a dock, Jindel has four simple words of advice: "Add some dock doors."

Meanwhile, more shippers are increasingly working with carriers to take out bottlenecks across the supply chain—and it's those shippers who will be best rewarded come contract renewal time.

John D. Schulz is a contributing editor for SCMR

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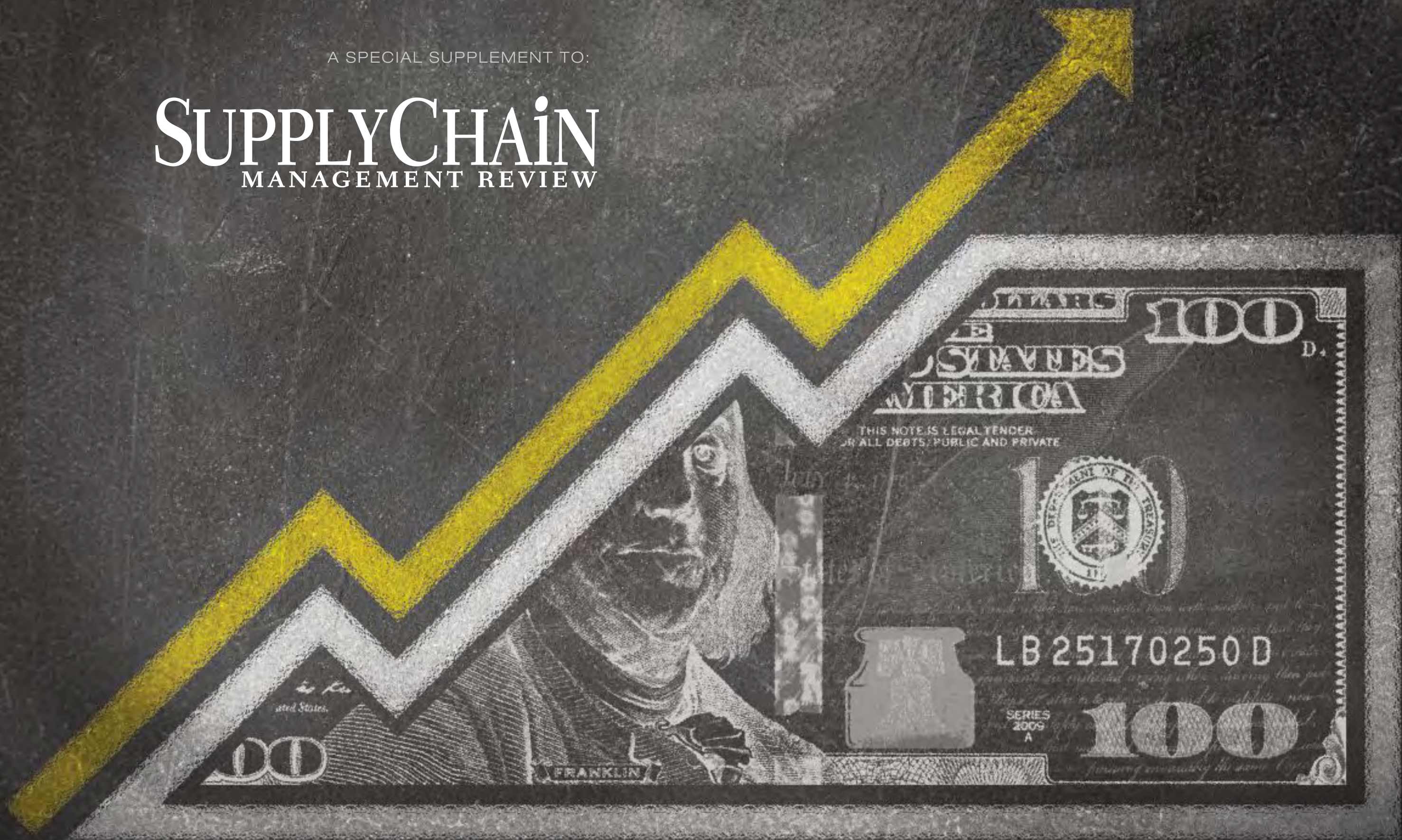

7 *supply chain* FINANCING TRENDS *to watch*

As supply chain financing evolves, and as more financial companies take an interest, these seven trends will be driving the sector over the coming year.

BY BRIDGET McCREA, CONTRIBUTING EDITOR

As the world's supply chains become more complex, the financial infrastructures that support them are evolving in new and interesting ways. Whether it's opening up the opportunities to a wider swath of companies, incorporating blockchain into the process, or helping supply chain managers become superheroes, supply chain financing is doing its part to support transactions around the globe.

The new definition

What once fell under the factoring umbrella, where a company sells its receivables to a third-party factor as a way of preserving cash, supply chain financing now involves large banks, financial technology companies (fin techs), specialized financial institutions and other entities that support suppliers that need working capital and liquidity.

"An executive at a major financial institution estimated that his firm performs $2.2 trillion per day in trade finance transactions, which typically includes loans to suppliers to buy raw materials, components and finished goods," writes Dale S. Rogers, an ON Semiconductor professor of business at Arizona State University, in his new book, "Supply Chain Financing: Funding the Supply Chain and the Organization."

"Given that the 2017 U.S. gross domestic product (GDP) was approximately $19 trillion," he continues, "this is a substantial amount of activity designed primarily for supporting procurement operations around the world."

A lot of the activity described by Rogers is being driven by suppliers that have tightened their supply chains and extended payment terms, two trends that have negatively affected their suppliers' financial positions. This, in turn, has pushed companies to find more creative ways to finance their diverse and underfunded supply bases. "I think Procter & Gamble was the leader in moving to 120-day payables," said Rogers in a recent interview with *SCMR*. "That was unheard of six years or seven years ago, and now that whole consumer products sector has lengthened out its payables."

Supply chain financing comes into the picture and helps to fill those gaps. Done right, the process helps both buyer and seller by improving liquidity, enforcing discipline in the approval of invoices and taking the variability out of the timing of payments. "The supply chain is a very important source of capital, and is about more than just make-source-deliver at this point," Rogers continued, "it's also about funding, and freeing up capital for your organization."

7 key trends

As supply chain financing continues to evolve, some key trends are emerging in the space. Following are seven to watch this year.

1) Companies are using their supply chains to keep tighter controls on working capital. Made up of receivables, payables, inventory, cash and other assets, working capital has become a focal point for a lot of companies. "They're using their supply chains to manage that capital a lot tighter," Rogers contends. For example, they're moving assets off their balance sheets and onto their income statements—a shift that helps organizations "unburden themselves of assets and improve their financial positions." To manage these shifts, Rogers believes supply chain professionals should focus on capital and cost flows within their own supply chains. That means asking yourself questions like: How are my suppliers managing their capital? What does our own working capital look like? And, how can we change the way we're paying our suppliers?

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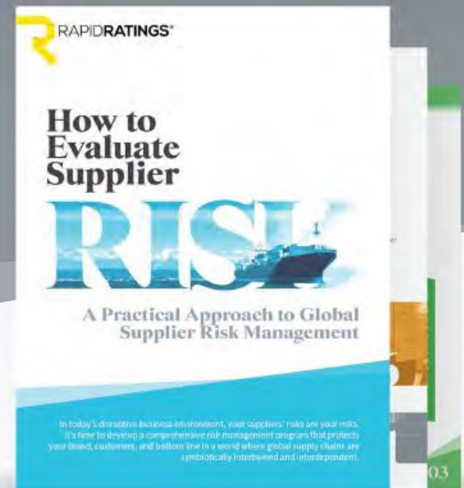

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2) A larger pool of providers is offering a wider array of financing options. Supply chain financing used to be the domain of factoring companies that would buy companies' receivables at a discounted rate in order to free up working capital for them. That has changed significantly over the last few years. "One of the biggest changes that has happened is that there are now more players offering a wider selection of alternatives in the market," says James Gellert, chairman and CEO at Rapid Ratings International. For example, credit providers have taken an interest in providing capital while technology providers are enabling that transfer of funds and/or other mechanics associated with the evaluation of both customer and supplier. "This mirrors trends in digitalization and data management with small- to midsized enterprise funding," Gellert points out, "and the overall expansion of technology and data usage."

Today's supply chains are about more than just make-source-deliver, which means that the people who run them need to be able to speak and understand the language of finance.

3) The definition of "fundable transaction" continues to expand. As the number of funding sources expands, those sources are essentially "broadening the spectrum" of entities they're willing to fund. According to Gellert, this has created opportunities for more supply chain partners to effectively manage their own working capital and operate in a healthier, more financially-sound manner. "As long as the 'customer' is of a strong enough quality, and as long as the supplier actually delivers on whatever product or service is being commissioned," says Gellert, "those arrangements can be deemed pretty good risks. These types of trends are pushing more providers to open up the definition of what they consider to be a 'fundable transaction.'"

4) Supply chain managers are becoming financial superheroes. Today's supply chains are about more than just make-source-deliver, which means that the people who run them need to be able to speak and understand the language of finance. "That's the lingua franca of organizations right now," says James B. Rice, Jr., deputy director at the MIT Center for Transportation and Logistics. "It's not necessarily the language of supply chain, but knowing the language of finance will help the practitioners communicate not only what the costs are, but also where the opportunities are." After all, supply chains are franchise builders and growth engines, Rice says, even if all practitioners don't see it that way. "Get your elevator speech ready. When you see your CFO tell him or her: 'here's how our supply chain is affecting revenue, profitability and working capital,'" Rice suggests. "If you can do that, you'll be a superhero."

5) Blockchain gains momentum in supply chain finance. Two years ago, FnConn, a subsidiary of FoxConn, partnered with online lender Dianrong to launch Chained Finance, a blockchain-based supply chain finance platform. "By using the Chained Finance platform, every payment and every supply chain transaction can be more transparent, manageable, and easily authenticated," FnConn's CEO said in news interviews at the time, noting that the platform supports suppliers of all sizes while "ensuring the timely delivery of products to end customers and improved efficiencies across the entire supply chain." Fast-forward to 2019 and Joe Vernon, practice leader, supply chain analytics, at Capgemini is seeing more companies incorporating blockchain technology into their supply chain financing efforts. "Foxconn basically had a lot of vendors in China that needed credit, so it turned itself into a bank," says Vernon, who is currently working with two customers on related pilot projects, "and then used blockchain to create a trusted network of vendors to subsidize. It's genius."

6) IoT, machine learning and artificial intelligence are facilitating supply chain finance relationships. Blockchain isn't the only new kid on the block in supply chain financing right now. According to Antonella Moretto, assistant professor at Politecnico di Milano's school of management, IoT, machine learning (ML) and artificial intelligence (AI) are all making an impact on the sector right now. And while these technologies are still maturing, Moretto says AI is of particular interest to companies that are doing supply chain financing deals. "It's very useful with credit scoring," she explains, "with some technology platforms doing the legwork on the scoring, and then presenting companies with the best financial proposal for each supplier."

Based on their success so far, Moretto sees more AI,

ML and other advanced technologies making their way into the supply financing sector in the near future. "The more data that can be evaluated, the more precise decisions can be made on it," Gellert adds, noting that AI, neural networks, and/or human evaluation all continue to modernize the supply chain financing industry. "This industry is relatively old and hasn't had a lot of huge advances," says Gellert. "But I think we're at the stage now where some really significant and interesting advances are taking place."

AI, ML and other advanced technologies will make their way into the supply financing sector in the near future.

7) ***Demand for supply chain financing is going to continue.*** As he looks around at the major trends taking shape right now in the global economy, Politecnico di Milano Professor Federico Caniato expects demand for supply chain financing to rise significantly over the next few years. "With interest rates rising, new trade barriers being enacted, and other issues affecting the working capital of companies," says Caniato, "no one can take available liquidity for granted." That rule applies both in and out of the company's four walls and across the entire supply chain. "Companies can't just look at their own working capital without concern about the impact that it has on the rest of the supply chain," says Caniato, who points to the global financial crisis of the 2000s as one example of why expanding payment terms to suppliers is not necessarily the smartest move. He adds: "A lot of suppliers suffered and then that backfired to their customers. Using supply chain financing can fill those gaps and help even the smallest of suppliers stay financially healthy and operational."

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Enhance the value of your supplier relationships

Appropriate sourcing business models enable flexibility and mutual benefits

By Becky Partida, APQC

Becky Partida is senior research specialist, supply chain management, APQC

Supplier relationship management, or SRM, is commonly used by organizations to ensure suppliers adhere to established contract terms and performance objectives. A recent survey conducted by APQC and *Supply Chain Management Review* (*SCMR*) revealed that most organizations are familiar with the principles of SRM, and that nearly 40% of organizations are using SRM with their suppliers to some degree. Nearly a quarter of respondents indicate that their organizations do not use SRM but are exploring its use.

Many organizations that do not use SRM intend to implement it in the near future. Although 31% of survey respondents are not using SRM, when asked about the likelihood that they will implement the approach, 68% of respondents said that it is extremely to moderately likely.

Clearly organizations consider this way of managing suppliers worth adopting. By setting measures and monitoring a supplier's adherence to an established contract, organizations reason, they can ensure that a supplier delivers the product at the lowest cost.

This is not surprising given the impact that procurement and supplier performance can have on the bottom line. What organizations neglect to consider is whether such a limited approach to managing suppliers is the best to use for *all* supplier relationships.

APQC, in collaboration with Kate Vitasek, Emmanuel Cambresy and Bonnie Keith, suggests a more nuanced view of developing and managing supplier relationships. APQC recommends that organizations weigh whether traditional SRM focused on cost and compliance is the best approach to use with all suppliers, instead of mainly with transactional suppliers. For suppliers that are more integral to an organization's success, provide a highly specific product, or have the potential to develop innovations that can benefit both parties, APQC recommends the development of a more strategic and collaborative relationship business model.

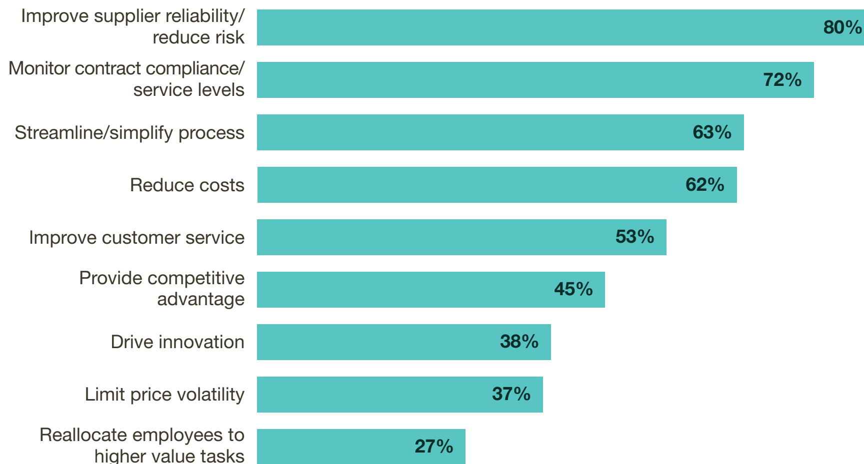
Benefits of supplier relationship management

When asked to consider the benefits of widespread deployment of SRM, respondents to APQC and *SCMR*'s survey rated tactical benefits the highest. Figure 1 presents the full list of benefits reported.

Most survey respondents consider the day-to-day benefits of implementing SRM across their supply base. The most commonly held benefit is the improvement of supplier reliability—or the expectation that managing supplier performance through standard measures will motivate the supplier to perform consistently. Many organizations also consider the ability to monitor a supplier's adherence to the contract, as well as its own ability to simplify monitoring processes, to be benefits resulting from SRM.

To a lesser extent, organizations see the potential for SRM to result in additional competitive

FIGURE 1
Benefits of widespread deployment of SRM in supply base



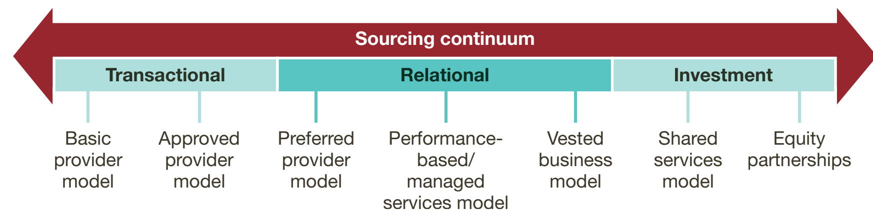
Source: APQC

advantage, innovation, pricing control and the ability to allocate employees to higher value tasks. With many suppliers providing organizations with materials key to their mutual success, using the relationship to develop mutual benefit is far more impactful.

In fact, APQC's opinion is that traditional SRM limits both buyers and suppliers by forcing them to have a relationship focused on contract compliance and on measures related to pricing and cost. Research by the University of Tennessee reveals that it is more accurate to view sourcing business models, and thus supplier relationships, as existing on a continuum (Figure 2), with one end representing a basic provider model. This transaction-based model is best suited for traditional SRM approaches focused on price because products purchased are readily available from multiple suppliers and transitioning from one supplier to another would have little to no impact on the business. On the other end of the continuum is an equity partnership model, in which a supplier and organization invest in creating a joint venture to ensure that they can acquire or co-create mission-critical goods and services.

In the middle of the continuum are sourcing business models based on increasingly collaborative relationships, a group of models in which the buyer and supplier establish mutual goals and ultimately generate benefits for both parties. With these types of win-win supplier relationships (e.g., preferred provider, performance-based/managed services and Vested), organizations can obtain the more strategic benefits seen to a lesser extent by those organizations using traditional SRM methods across their supplier base.

FIGURE 2
Sourcing business models



*Based on research with the University of Tennessee, *Strategic Sourcing in the New Economy: Harnessing the Potential of Sourcing Business Models for Modern Procurement*

Source: APQC

Hurdles to supplier relationship management

Respondents to the survey conducted by APQC and *SCMR* also noted hurdles to widespread deployment of SRM for their supplier base. As shown in Figure 3, one of the top hurdles seen by respondents was a lack of a clearly defined process or methodology for managing suppliers. Over one-third of respondents also saw a lack of a guiding strategy for supplier relationship management as another hurdle.

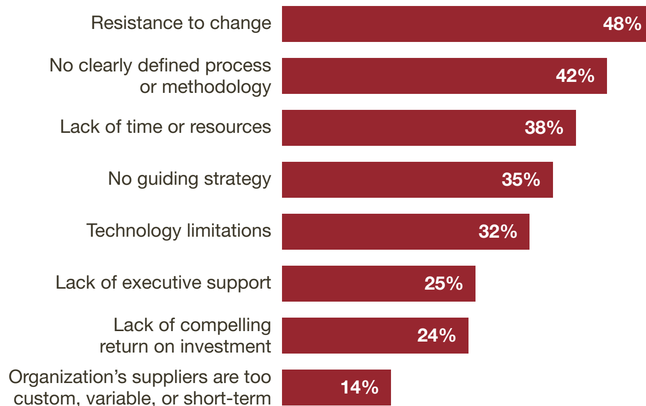
Going beyond traditional SRM to use a sourcing business model approach with key suppliers can address the lack of methodology and guiding strategy for supplier relationship management. For supplier relationships at

the relational or investment level, buyers and suppliers establish joint goals at the start of the relationship that are tied to both parties' definition of success. This provides a clearer idea of how to determine whether the supplier is performing at a level needed for a successful relationship.

Although reported by only 14% of respondents, having suppliers that are too custom, variable or short-term can also be addressed using the sourcing business model continuum developed by the University of Tennessee. In a Vested model, for example, a key supplier collaboratively defines the goals and thus the measures that fit the services provided in that unique relationship, no matter how different it may be compared to others.

FIGURE 3

Hurdles to widespread deployment of SRM in supply base



Source: APQC

Flexibility and mutual benefit

Developing the right kind of supplier relationship based on the right kind of sourcing business model moves an organization from traditional SRM to the next generation. Although it does take some time and effort to determine the most appropriate sourcing business model to use and then develop a collaborative relationship that benefits both parties, the payoff does exist for organizations that look beyond the traditional approach for managing supplier relationships.

Real-life examples exist of how organizations can re-evaluate and adjust their supplier relationship management. Swedish telecom company Telia Co. AB evaluated its suppliers to determine which would be good candidates for a Vested sourcing model, a relational model in which both parties enter into a collaborative relationship that creates value for both. This partly involved determining which suppliers would be considered experts in their field, meaning that these suppliers would not need to be micromanaged on how they achieved their objectives. Dell worked with its reverse logistics provider FedEx Supply Chain to shift to using a Vested sourcing model with outcome-based measures focused on transforming processes. The decision to go this route was made after both parties realized that keeping a sole focus on cost was damaging their buyer-supplier relationship and was no longer leading to new savings.

One benefit to viewing sourcing relationships on a continuum is that organizations can re-evaluate the relationship with a given strategic supplier as circumstances change. As with Dell, an organization looking to shift the nature of a relationship can easily do so by comparing the current sourcing business model used with the supplier to models further along the continuum.

Not only does this approach benefit the business overall, but also staffing levels for sourcing and supplier management. By sorting the more transactional relationships from those that are more collaborative and strategically focused, the organization can allow staff to focus their efforts on relationships that require more attention.

About APQC

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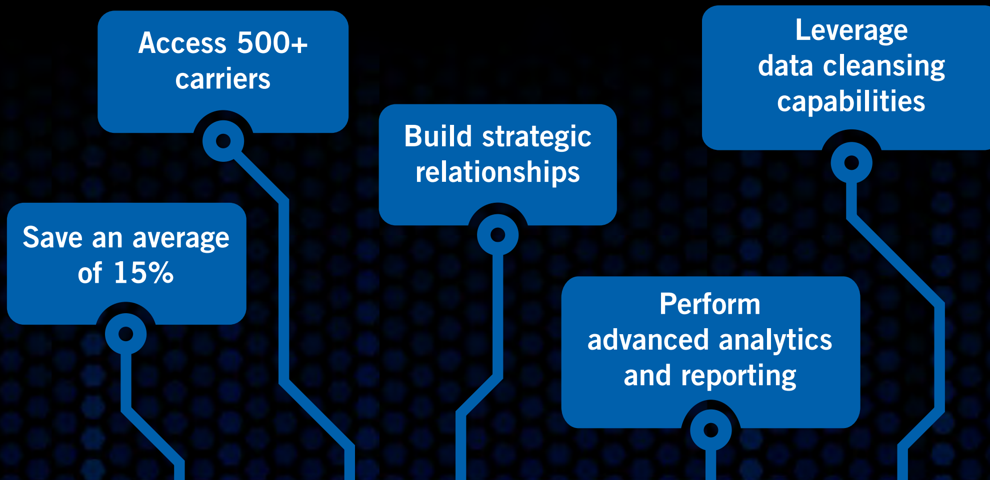

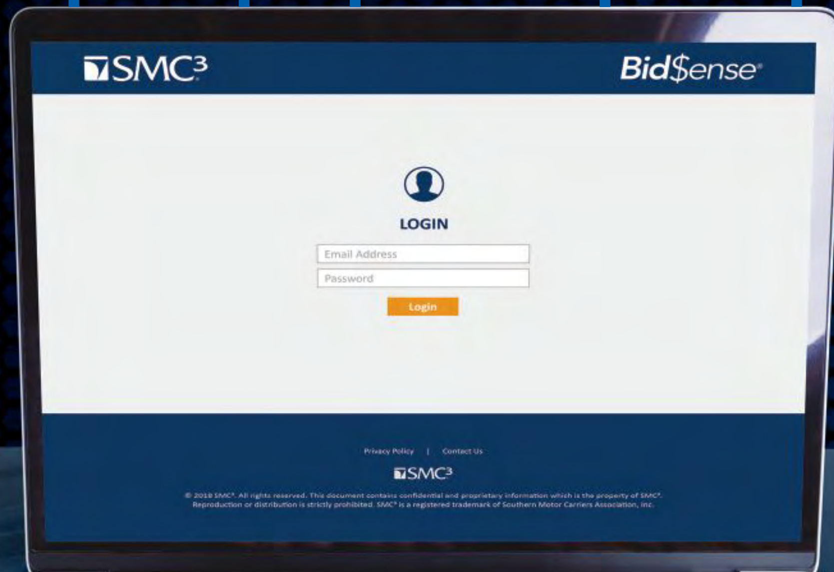

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