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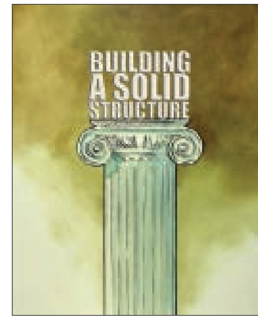

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The Spirit of Renewal

Spring is a time for renewal. It's a time for reassessing the way we've been doing things and making changes in a manner that ensures forward progress. That's a recurring theme of the articles in this May/June issue of *Supply Chain Management Review*. It's also speaks to the magazine itself, as we'll explain in more detail below.

But remember. In renewing your supply chain operations, you need to do it on a solid foundation.

Certainly, the process through which you make your supply chain decisions needs to be one of those foundational elements. But how often do we make important decisions based on little more than intuition or simply past experience? Too often, answer business authors William B. Lee and Errol Wirasinghe. Their article lays out a seven-step approach to putting real structure around supply chain decision making.

Accurately matching supply with demand has to be considered another essential building block to supply chain success. A well-conceived and executed sales and operations planning (S&OP) program can enable that. Problem is, many S&OP initiatives that begin with great promise devolve into a disjointed, largely ineffectual exercise. Like the decision-making article, Manoj Singh's S&OP feature in this issue offers a structured approach to avoiding that scenario.

Educators Peter Duchessi and IndoShobha Chengalur-Smith of the University of Albany focus in on the state of adoption of three core supply chain competencies—supply chain design, inventory management, and IT investment and adoption. Many organizations still fall short of mastering performance in these areas, the authors discovered in their research. They offer some valuable advice on becoming more "sophisticated" practitioners of these supply chain arts and sciences.

Frank Quinn, Editor
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With the building blocks in place and the spirit of renewal in full bloom, who knows what levels of supply chain excellence can be achieved?

Now about that spirit of renewal as it relates to *SCMR*. With this May/June 2010 issue we begin this stage of our publishing life as part of a company called Peerless Media, a divison of EH Publishing Inc. Joining us are three sister publications that also were formerly part of Reed Business Information (RBI). They are *Logistics Management*, *Modern Materials Handling*, and *Material Handling Product News*.

Our whole staff is very excited about the move. Being part of smaller company gives us more flexibility in responding to reader information needs and launching new features both in the print publication and on our web site. In fact we invite you to become regular viewers of www.scmr.com to witness the progress we'll be making. And as we've done since our founding in 1997, we promise to keep delivering the supply chain thought leadership you've come to expect from *SCMR*.

Francis J. Quinn

SUPPLYCHAIN MANAGEMENT REVIEW

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InSIGHTS

BY LARRY LAPIDE

Change Your Inventory Mindset

The sooner you can learn the difference between "good" and "bad" inventories, the better off your supply chain will be.

Dr. Lapide is a lecturer at the University of Massachusetts' Boston Campus and is an MIT Research Affiliate. He welcomes comments on his columns at llapide@mit.edu.

Ok, I have to confess that I love inventories. That is, "good" inventories that are deployed for good reasons such as to mitigate against uncertainties, or are based on sound economic principles. Of course, I don't like "bad" inventories that don't serve a purpose and inevitably wind up being drastically marked down in price or disposed of.

Many supply chain managers would think me wrong. They and financial managers don't often appreciate inventory. Generally, the latter managers especially don't like inventory assets, since they don't understand the benefit of using valuable financial capital to acquire and just hold them. Lean advocates are charged with cutting waste to the bone and in their zeal for getting leaner often eliminate good inventory with the bad. They risk a problem in customer service because their supply chains might then be too lean or emaciated (in a sense).

While working at AMR Research, I wrote an article where I used the analogy that inventory is like cholesterol. Both have two components to them: good and bad. So like cholesterol, you want to keep your total inventories as low as possible, but you don't want the good component to get too low. How did I become such an inventory advocate?

Over 30 years ago I started my career at Arthur D. Little (ADL), a consulting and research firm that at that time was at the forefront of inventory management consulting. Robert (Bob) Brown had worked there. He is the father of the exponential smoothing forecasting methods used to feed scientific inventory management processes, such as statistically setting safety stocks. Many of the forecasting and inventory methods Bob espoused were developed during his tenure there, and today many systems still enable them. Additionally, ADL's President, John F. Magee, wrote one of the first (if not the first) industry books on the topic, titled *Production Planning and Inventory Control*. He introduced base-stock inventory management principles. These words are ingrained in my mind from the 2nd edition of the book: "Basically, inventories serve to decouple successive operations in the process of making a product and getting it to consumers." And further, "…inventories free one stage in the production-distribution process from the next, permitting each to operate more economically." (Of course, the latter holds only to the point where decoupling no longer yields benefit). Thus, I learned that inventory decouples (often uncertain) operations to ensure a smooth flow of product throughout a supply chain—however, to a point.

The View of Inventory Must Change

My pedigree has given me a healthy view of inventory, as I'm able to differentiate good from bad inventory. Most managers now need this view for two reasons. The first is that good inventories need to be pre-positioned in order to fully capture the economic rebound and take advantage of the impending uptick in business.

The second reason is that (as I noted in my March/April 2010 *SCMR* column, "Cheap Oil Is Dead—Again") today's cost- and inventory-efficient supply chains will need to change to energy-efficient ones as the price of oil continues its gradual climb upward. Energy efficiency will require becoming less fixated on reducing inventories via leveraging faster energy-inefficient freight modes, and instead becoming more reliant on slower, more efficient modes—such as ocean rather than air, barge rather than rail, and rail rather than truck for inbound and inter-facility shipments. However, this move to energy-efficient chains could lead to an increase of in-transit inventories and other inventories that result from using slower transport modes. Additionally, more goods will need to be stocked closer to consumers. Both factors can increase inventories if managers do not deploy only "good" inventories along energy-efficient supply chains.

Understanding Good Inventories

Bad inventories are those deployed just-in-case as well as those deployed using gut instincts rather than sound analysis. In contrast, good inventories are positioned with very specific purposes and are based on economic principles. Examples of good inventories include:

- The best inventories are *customer-facing*. These are held near enough to the consumer to meet uncertain demand while meeting delivery requirements. In reality, some type of inventory needs to be deployed in advance of a customer order so that fulfillment can be flawlessly executed; whether the inventory is held in raw materials, works-in-process, or finished-goods form. This mindset also applies to inventory held by either a company or its suppliers.
- *Replenishment or cycle stocks* are good when they are based on optimizing order quantities and production lot sizes. The optimizations normally involve tradeoffs, such as balancing inventory holding costs versus setup/ordering costs.
- *Buffer inventories* are generally good because they decouple operations. Per the theory of constraints, inventory should be held before a bottlenecked operation to ensure that its throughput is maximized. Similarly, inventory needs to be held following an unreliable operation to ensure that any disruptions do not impact downstream operations.
- *Safety stocks* are good inventories because they are needed to cover vagaries in customer demand and unreliable supply. They decouple supply and demand operations to ensure reliable supply. If they are set based on achieving levels of customer service, they are largely good. However, if based upon an arbitrary rule-of-thumb, such as weeks-of-supply, they will likely include bad inventory for some items and not enough good inventory for others.
- *Pre-build inventory* is mustered in anticipation of high seasonal demand to work around manufacturing limitations and to smooth production. This inventory is mostly good because it allows production capacity to be less than what peak demand dictates, thus saving expensive capital expenditures. A certain amount of bad inventory can be generated if pre-building is done too soon or in greater quantities than needed. Analysis is needed to minimize bad pre-build inventories.

The above examples represent almost all types of good inventories. The real challenge for supply chain managers is to shift their company's mindset regarding the value of inventory. The cheap oil era is history and hopefully soon the recession will go away as well. Their demise should bring a healthy respect for inventory so that managers don't go overboard and throw bad inventory after good.

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Managing Global Trade Finance

Supply chain managers need to learn more about what's involved in financing international goods movement—and the new methods and technologies available to help them.

By Gene Tyndall and Tom Beube

In the past decade, thousands of companies worldwide have embraced strategic sourcing and international distribution. About 90 percent of all companies in North America now import and/or expert goods and products. Effective management (and financing) of global supply chains is increasingly important to the economic health of companies across all industry sectors. Yet many supply chain managers do not fully understand the economics of these global movements or the best practices to manage them effectively.

Gene Tyndall (gtyndall@tompkinsinc.com) is the EVP for Global Supply Chain Services at Tompkins Associates. Tom Beube (tom.beube@bankofamerica.com) is SVP, Global Trade and Supply Chain Solutions, Bank of America.

The guidelines that Tompkins Associates developed for the Institute of Management Accountants, "Managing the Total Costs of Global Supply Chains," emphasize the need to identify all costs of sourcing and distribution, and make intelligent use of innovative financing methods.

Although an in-depth knowledge of global trade financing is not always necessary, supply chain managers at least need a working knowledge and awareness of the key related issues and solutions. This column provides an overview of three basic categories of global trade finance awareness for supply chain managers: (1) the terminology of global trade finance; (2) the key business processes involved; and (3) the methods and technologies available to help manage the financing.

Global Trade Finance Terminology

The most understandable of the supply chain cash flows—the speed at which cash flows through supply chains—is a key performance indicator (KPI) that supply chain managers need to tightly grasp. The main indicator, known as the Cortera Supply Chain Index (SCI) (www.cortera.com), tracks the length of payment periods among suppliers, transporters, and customers. The Cortera SCI currently reports at nine days beyond the average payment terms that are specified by accounts receivable. Because of low cash flow and increased debt caused by the recession, the SCI is almost 20 percent less healthy now than in January 2009.

Most supply chain managers have become familiar with terms such as costs of goods sold (COGS), total landed/delivered costs, and working capital—all of which are impacted directly by lengthy supply chains. Few, however, are able to explain the terms that represent the "financial supply chain"; that is, the supply chain flow of funds associated with the movement and storage of goods throughout the chain. The flow of funds may be enabled by letters of credit (LCs) or by open accounts.

The costs of customs, taxes, and security compliance are part of the trade finance equation. The Incoterms (International Chamber of Commerce Shipments and Delivery Terms) that surround these financing requirements have somewhat rigid definitions. Supply chain managers do not have to become experts in these terms or regulations. Yet they need to know where to go with questions or for clarification. Key resources include their freight forwarders, logistics services providers, customs advisory firms, their banker's advisory services, or globally experienced consultants.

Key Business Processes of GTM

Global Trade Management is (GTM) is the umbrella term that describes the processes required to support cross-border transactions. It's the holistic framework against which companies view their global supply chains—from end-to-end, involving the multiple partners that comprise the chain. Global trade finance is one component of GTM; thus, there are several processes that address the financial flows.

One very useful resource is the Stanford University 2009 research report titled "How Enterprises and Trading Partners Gain from Global Trade Management: A New Process Model" (www.gsb.stanford.edu/scforum). Sponsored by Trade Beam, this work identifies 106 "process steps" in the importer/exporter trade flows.

Supply chain managers involved in these processes are typically aware of the steps associated with efficiencies in global trade. Yet the intricacies of global trade finance are such that gaps frequently exist in their knowledge and ability to fully understand and to gain the benefits of tightly managing financial flows.

The Stanford report cites numerous categories of financial flows that all supply chain managers should be familiar with. They need a basic understanding of these costs—which cover procurement, inventory, financing, logistics insurance, and more—and their underlying processes. Once supply chain managers achieve that level of understanding, they can decide on the best approaches to identify, plan, manage, and control the costs.

Methods for Managing Costs

Over the past decade, several methods and technologies have been developed to respond to the rapid growth of global trade flows. These can be viewed with two broad categories: services and technologies.

Services. Global trade groups at leading banks specializing in global finance assistance provide trade services such as LCs, collections, bankers' acceptances, and risk mitigation tools. They also provide support services for growing open account trade business. In addition, they look for ways to optimize tied up working capital.

Recently, due to the economic impacts of global trade, the burden of financing has fallen on suppliers and has pushed banks to focus on vendors. Larger buyers have the leverage to push payment terms to the cost of suppliers' DSO. Thus, the leading banks have designed services to create more balanced risks for the buyer, seller, and the bank.

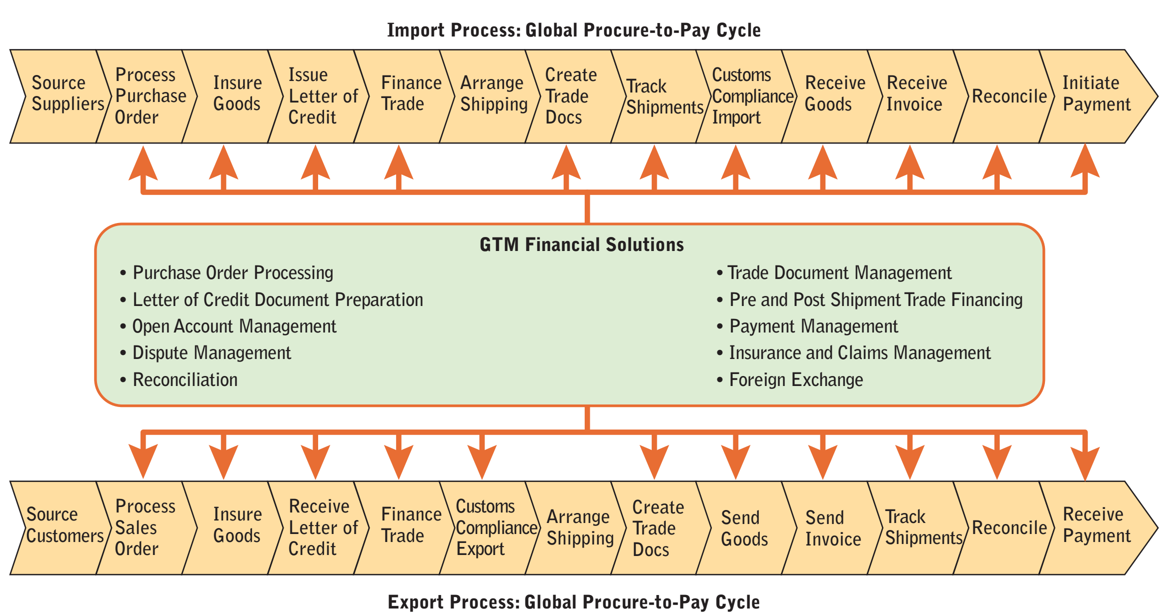
Technologies. The leading GTM applications support many of the 106 processes identified by the Stanford report. (See accompanying exhibit.) Through trade portals, trading partners can interact with either LCs or open accounts. The systems generate export/import documentation, provide tax and duty rates, and enable trade finance objectives such as reducing transactions fees while supporting compliance controls and providing visibility.

GTM systems also help supply chain managers determine total landed/delivered costs. The ability to calculate these for various scenarios or orders to delivery is critical to effective supply chain costing and product pricing.

In summary, companies stand to benefit significantly by improving their global trade processes, information, and knowledge. To assure that finance is considered comprehensively in global supply chain plans, supply chain managers should develop a working awareness of trade finance and the key methods and technologies of supply chain finance.

EXHIBIT 1

Features of GTM Financial Solutions



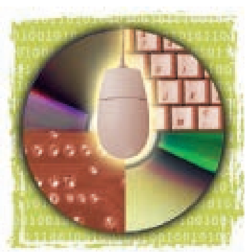
Source: TradeBeam

Infrastructure: The Key to a Greener Supply Chain

As the global greening trend accelerates, companies should retool their supply chain infrastructures in order to keep up.

By Michael J. Burkett

Michael J. Burkett (mburkett@amrresearch.com) is Vice President of AMR Supply Chain Research, Gartner Inc.



As manufacturers go global, the supply chain infrastructure that served them well locally may be insufficient for their new needs. Expanding into emerging markets is core to almost every major manufacturer's growth strategy. Yet many emerging markets lack the supply chain infrastructure needed to execute. Nokia discovered this when it launched a new value-based cell phone in India. Its traditional retail channels did not exist in India, requiring a new strategy of transporting product to the small kiosks found across the country.

Manufacturing and product supply strategy takes on new dimensions when serving global markets. Demand for new product features across these markets exacerbates supply chain complexity with increasing product options and SKUs. This complexity is forcing leading companies to re-think their product supply network strategy to become more flexible and to maximize utilization. Coca-Cola has set a goal to double its revenue by 2020, by expanding into new product categories. In the automotive industry, Ford has embarked on a design strategy that increases product platform use. This allows vehicles to be built in multiple plants and postpones product variability to flexibly meet shifting market demands.

Amidst this need for increased capacity is a demand to stop wasting the planet's valuable resources. Large manufacturing plants account for the greatest contribution to the world's emissions and energy consumption. This places the burden upon plant operators to improve operating efficiencies if there is to be any significant reduction of global greenhouse gases. Sustainable products and a supply chain infrastructure are required to reduce these green house gas emissions and the total carbon footprint of the supply chain. Measuring the supply chain carbon footprint will be a requirement for all manufacturers. This is especially important to consumer product companies. Wal-Mart is raising the bar in retail, requiring suppliers to report a 15-point sustainability index for products.

Start with being demand-driven

Establishing the new supply chain infrastructure is not just about building more plants or laying more roadways. It requires designing products and supply networks that deliver customer value profitably while maximizing infrastructure utilization. Being demand driven increases customer service profitably with the lowest risk to the planet's resources. (see Exhibit 1)

We recommend establishing several capabilities to build this demand-driven infrastructure:

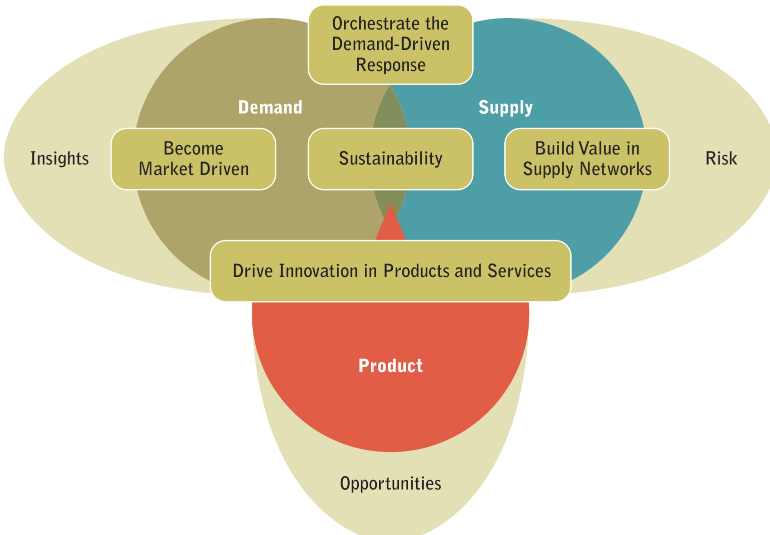
Become market-driven

Being market driven is not new to marketing organizations, but is often a foreign concept to supply chain professionals. Leaders in global supply chain understand their markets and align their supply chain infrastructure to support this demand.

Best practices for becoming market driven include segmentation to ensure supply chain and market alignment. Manufacturers must sense demand at the point of consumption and share that signal with partners. Shaping demand allows the supply chain to influence demand through practices such as common parts or reduced cost and pricing.

EXHIBIT 1

Rebuild Infrastructure for Demand-Driven Value Networks



Source: AMR Research, 2010

es in place that ensure they can deliver value. Core strength here allows companies to mature beyond a traditional reactive supply chain to one that's capable of delivering a profitable demand-driven response.

Predicting supplier risk is one capability that Intel uses to ensure a reliable and profitable response where missing a day's production can cost $100 million. During the 2009 down-turn, if any supplier had credit coming due in the near future it was flagged for assessment. These metrics improve supplier sensing and support better decision making with a 12- to 24-month view on potential risk.

The foundation for value in supply networks is laid upon building blocks that include agility, collaborative supply networks, predictive supplier management, and operationalized innovation among others. These core capabilities maximize infrastructure asset utilization by eliminating wasteful non-value added activities.

The demand-driven response

Reacting to demand without understanding the total cost-to-serve wastes valuable resources. Orchestrating the demand-driven response applies decision support techniques to validate customer desire for a product while operating a profitable supply network to satisfy demand.

Common practices for orchestrating the demand driven response include network design, S&OP, and product portfolio management. These techniques put a decision support system in place that uses all demand and supply criteria to ensure a profitable demand-driven response.

Drive innovation in products and services

Leading companies are innovating both products and supply chain services to impact the entire customer experience. Cross-functional teams observe the environment in which customers use products. This leads to innovative delivery models where supply chain capabilities enhance how products are used.

Driving innovation in products and services requires observing how customers experience products within their environment. Impacting this experience may require deploying supply chains in new ways. Changing organizational norms is often a difficult first step that requires supply chain and other functions beyond marketing to understand these needs. Customer requirements must be defined beyond product attributes alone.

Build value in supply networks

Companies must put foundational supply chain process-

Sustainability maximizes use of resources

Organizations that fully embrace and quantify sustainability as a key business strategy will drive efficiencies and cost savings throughout their supply chain. This decade will define the foundations of the low-carbon economy where supply chain infrastructure attributes—including production and energy—will be central to this transformation.

Reactive or tactical sustainability is capable of driving down bottom-line costs and qualification in future green markets, but won't allow an organization to drive increased market share, exploit new markets, or emerge as leaders. The AMR Research Sustainability Maturity Model recognizes three key organizational progressions toward authentic sustainability: strategic transformation, structural normalization, and operational implementation.

Start Today

Customer demand for increased product variety is exploding supply chain complexity, requiring a fresh look at the infrastructure needed for a profitable response. The physical demands of supply chains will be pushed to deliver more just as pressure to reduce the carbon footprint of products is greater than ever. We believe that the key to maximizing utilization of supply chain infrastructure lies in being demand-driven. By moving toward demand-driven value-networks, manufacturers and retailers will align their supply chains to optimally deliver customer value.

The Resolute Benchmarker: Kate Vitasek

By John Kerr

John Kerr is a special projects editor for Supply Chain Management Review

"How can we not give supply chain practitioners a tool that helps them say whether they're bad or good at what they do?"

That was the challenge that Kate Vitasek threw out a few years ago to her fellow board members at the Council of Supply Chain Management Professionals (CSCMP). Vitasek, an inveterate campaigner for supply chain performance measurement and management, argued forcefully that the profession urgently needed standards for its processes.

At first CSCMP's research committee voted down the idea. But Vitasek would not be deterred, and her reasoning won out. She and a group of colleagues went on to literally write the book on supply chain management process standards. Drawing on the insights of 50 or so experts across the U.S., they compiled the CSCMP book—the first set of reference documents whose guidelines help supply chain leaders self-assess their organizations' current processes. The tools help identify process strengths and weaknesses and focus attention on areas where improvement efforts will drive the most benefit.

Kate Vitasek has led the development of practical benchmarking tools for supply chain professionals.

That's just part of what Vitasek has contributed to the profession. She and her colleagues at Supply Chain Visions—the strategy and education consultancy she founded in 2002—have also authored the "Warehouse Manager's Guide to Benchmarking" for the Warehouse Education and Research Council (WERC) as well as WERC's Warehousing and Fulfillment Process Benchmark and Best Practices Guide. And they donated their time to provide a glossary of logistics terms for CSCMP—a regularly updated listing that also appears on *Forbes.com*.

"I'm proud what we've done to lead the profession in developing some of the most practical and easy-to-use tools available for benchmarking today," says Vitasek. "The free glossary is the single most downloaded thing on CSCMP's site. Anyone who does not know our profession's terminology now has a free resource that that my firm volunteered to compile."

Vitasek has other platforms with which to preach the gospels of performance management and the implementation of metrics. She is also a faculty member for the University of Tennessee's Center for Executive Education and she teaches MBA classes on performance management and lean supply chains for Wright State University. She developed and teaches seminars for WERC. And she also finds time to be on the peer review board for the *Journal of Business Logistics*.

"Challenge" ought to be Vitasek's middle name. "I remember being told I was bossy when I was a kid," she smiles. "I think that being bossy was a way of getting others to get on board with my goals! I guess I'm still bossy because I still like to tell people where I'm going—but thankfully I've found better ways to communicate and recruit others besides telling them what to do!"

In college at the University of Tennessee, her talents for challenging and communicating were recognized. She won three Chancellor's Citations in her senior year—one for leadership, one for academics, and one for leading the student chapter of the American Marketing Association to second place among universities nationwide. She graduated with a B.S. in marketing, and went on to graduate summa cum laude with an MBA in logistics, also from Tennessee. One of her strongest influencers at the time was Dr. John Langley, not only as an academic but as a model for how to lead. "He was president of CSCMP then. He went around the country teaching companies how to do things better," she says. "I remember thinking that's it—I want to do that."

In the workplace, Vitasek put what she'd learned to good use as a supply chain practitioner, serving in a range of marketing, operations, and general management roles at companies that included Procter & Gamble, Kroger, Accenture's logistics strategy practice, Microsoft, and Modus Media International, a global third-party logistics provider.

But Vitasek's sweet spot is benchmarking—specifically, performance measurement and management. She has given more than 100 speeches to industry groups and universities on those topics, and authored over 75 articles which have appeared in publications such as *Journal of Business Logistics, Supply Chain Management Review, Aviation Week, Distribution Business Management Journal, The Manufacturer*, and *APICS Performance Advantage*.

As a consultant, Ms. Vitasek brings a unique blend of consulting, practitioner and general management experience to the organizations she works with. Her firm's philosophy is to "teach a company to fish" rather than to present findings that languish in vinyl binders or to implement change from the outside.

Vitasek cites as an early influence the classic she read in college: Max Dupree's *The Art of Leadership*. She still uses it as a reference. No surprise, then, that she is crystal-clear about what the term "leadership" means. "It's being able to see a goal, comprehend what is needed to get there, and describe to others a path to the goal," she says. "Then, having described the path, the leader must be able to communicate it to others in a way that generates enthusiasm and a desire to follow."

That describes her own participative approach as a leader of bright, experienced, creative professionals. "I like to create the vision and work with my team to develop a plan to achieve it—and then let the team use their abilities to get the job done," she says. She cites the value of what she describes as a "what's in it for *we*" mentality. Too much oversight is a sign of poor leadership, she says. "If you've hired the right people, you're leading them in the right direction, and they're motivated to achieve mutual success, you should not have to micromanage them."

Vitasek is equally explicit about a leader's obligation to look long-term. "Today's workforce is stuck in an activity trap—heads-down, going to work every day, doing the same things they've done every day. A good leader will get people out of the activity trap and challenge them to get to focus on outcomes, not activities," she says. That leader will have the courage to manage for the long term despite the constant pressure to focus on short-term priorities.

And Vitasek would not be Vitasek if she did not mention the importance of having those outcomes be measurable. "Many people think I am a measurement nut," she says. "How else will you and the others on your team know if you are being successful? Having measurable success targets brings sharpness to your vision."

Asked about where today's supply chain managers still need to step up as leaders, she highlights a paucity of people skills. She contends that the soft skills of communication, motivation and empathy are far more important than the hard skills of supply chain leadership.

"I like to create the vision and work with my team to develop a plan to achieve it."

So what is Vitasek focusing on now? You cannot take the challenge out of the challenger. She recently urged the CSCMP to simply give away rather than continue selling the process benchmarking standards that she and her team had developed—so the benchmarks would be freely available to everyone in the profession.

Vitasek has always been her own fiercest challenger. She recalls daydreaming through seventh-grade algebra class about being a business leader—a goal she had achieved by her late twenties. These days, her stated purpose in life is to educate people so effectively that they achieve levels of performance never realized before. Today, the challenge she's setting for herself is to have the theme of her new book, *Vested Outsourcing*, be as influential a decade from now as the Lean and Six Sigma philosophies have become.

It's a fair bet that Kate Vitasek is already working up some handy metrics to gauge her progress toward that goal. "I try to have quantifiable goals for just about everything," she says.

Driving a Turnaround in TUMULTUOUS Times

By Thomas J. Kedrowski

Thomas J. Kedrowski is Senior Vice President, Supply Chain and Operations for PolyOne Corp. He can be reached at tom.kedrowski@polyone.com

For PolyOne Corp., the secret to survival and success is in the supply chain. This global provider of specialized polymers was burdened by excess inventory and production capacity, poor on-time delivery performance, and a sharp downturn in key markets. A series of targeted supply chain improvement initiatives took these challenges head on—and in the process got the business back on the path to profitability.

Three years ago, PolyOne Corp., was weighed down by excess inventory, poor on-time performance and over-reliance on equity earnings from commodity joint ventures. In addition, the recent economic downturn hit hard in some of the company's key markets, including automotive and building and construction. Certain analysts and investors believed that PolyOne—a premier global provider of specialized polymer materials, services and solutions (such as metallic-look vinyl used in home appliances, the soft-touch plastic on the handle of your razor, and medical-grade polymers for tubing)—might have to file for bankruptcy.

Instead, the company generated $218 million of free cash flow in 2009 and reduced net debt by $223 million. Its share price has risen about 580 percent to $8.97 from its low of $1.32 in March 2009. Some analysts are now recommending PolyOne stock as a buy.

How did the company increase cash flow in such a short time and during one of the worst economic recessions in history? Largely through improvements in supply chain management. This article will focus on some of the most compelling actions that led to those improvements.

Background

When I joined PolyOne as head of supply chain and operations in 2007, many challenges were clear, but progress was underway. The company was formed in 2000 through the consolidation of M.A. Hanna Company and a BF Goodrich spinoff, The Geon Company. The corporation that exists today is the product of acquisitions of several companies, each with its own way of operating. By the end of 2007, PolyOne had acquired five compa-


TIMES

nies over the previous eight years. However, as new businesses were folded into one entity, the company typically did not centralize or standardize key processes along the way. The lack of cohesion and consistency was evident on many levels—from one business unit operating under different names in different regions, to three different regions each hiring separate consulting firms to provide guidance on the same issue.

CEO Stephen D. Newlin, who joined PolyOne in February 2006, already had introduced efforts to resolve such inconsistencies and enhance service to customers. And some of these, such as improving on-time delivery, were beginning to show progress. But he was up against a company history in which previous management had launched multiple initiatives, hired numerous consultants to help carry them out, and produced very little profit-and-loss impact other than creating additional expenses. Highly touted initiatives often were incompletely implemented and always abandoned before having a chance to show positive results.

Despite such challenges, I also saw a company with potential to triple or quadruple its financial performance through improved management of the supply chain and enhancement of a number of key related business processes.

Manufacturing Realignment

With more than 40 production facilities around the world, PolyOne's manufacturing network was an obvious place to start the optimization process. By 2008, the company was seeing unprecedented increases in the costs of energy and raw materials, placing heavy pressure on cyclical business sectors. We also commenced a transition from a volume and price focus to a value-added solutions provider and were shifting our focus to more specialized solutions designed to take advantage of market trends in healthcare, electronics, bio-materials and sustainable products. At the same time, the downturn in the housing and automotive industries had diminished demand for some products. This development, combined with productivity improvements generated through the application of lean techniques, left the company faced with excess production capacity that was designed to accommodate the unsustainably high peak demand levels from the mid-2000s.

Rigorous reviews by our business units showed we could operate more efficiently and better leverage our global footprint by realigning a significant portion of our manufacturing assets with enough built-in flexibility to address mid- and long-term demand requirements, while improving service levels to our customers. We decided to rationalize production facilities and reduce our global cost structure through the implementation of a global manufacturing realignment program.

I saw a company with potential to triple or quadruple its financial performance through improved management of the supply chain and enhancement of key related business processes.

The effort faced one daunting challenge from the start: Employees were both cautious and skeptical about change. Some employees were concerned the realignment might disrupt service to customers or derail our growth plans. Additionally, the company had recently improved on-time delivery and some feared the manufacturing realignment might reverse that progress.

This wasn't the first time PolyOne had set out to make its manufacturing more efficient; a similar effort years earlier failed to effectively consider customer supply chain and service requirements. So, when we began planning the realignment project, we committed considerable time and effort to overcoming the internal resistance created by past failures. We specifically spent time highlighting how this new approach was different from previous efforts. The team used several change management techniques and process improvement techniques such as Failure Mode Effect Analysis (FMEA), Key Stakeholders Analysis, and Risk Mitigation plans to ensure that the project plan would be both robust and adopted by the organization on a global basis.

PolyOne launched the manufacturing realignment project in July 2008, with plans to close nine production facilities, including seven in North America, over a nine-month period. Detailed timelines, transition plans, and communication efforts helped minimize both disruptions to customers and impact to affected employees. We informed customers how their product orders would be affected and when those products would be moved from one location to another. As a result, there were no surprises and customers experienced an extremely low number

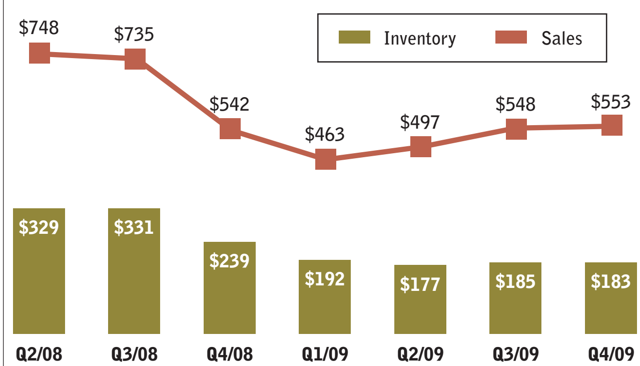
of service interruptions.

Since July 2008, through the manufacturing realignment and a global restructuring announced in January 2009, we have closed 20 percent of our manufacturing facilities and trimmed our workforce by approximately 20 percent.

EXHIBIT 1

Improvement in Inventory Levels (FIFO Inventory)

$ Millions



- Improved management and reduced cycle times
- Daily monitoring and reporting
- Weekly team reviews and progress reporting

Inventory Reduction

Just as pressing as the need to improve the efficiency of manufacturing facilities was the need to improve inventory management practices. While operations at PolyOne were generally decentralized, one process that unfortunately was consistent throughout the company was its approach to inventory. Business units spent the first six to eight months of the year building inventory levels—and consuming cash—while the strongest demand came during the second and third quarters, creating a significant dislocation between actual demand and inventory positions. This approach prevailed largely because PolyOne's incentive compensation plans focused on year-end, not year-round, operating efficiency. Consequently, the company often produced more of an item than was needed, figuring it would be able to sell it later. By the end of the year, inventory levels typically were at their lowest, but much of what remained on shelves had become aged inventory that no longer met customer needs. So, it often languished in warehouses for years—driving up the cost of both warehousing and inventory write downs, while under-serving customers' needs.

In August 2008 we formed a global inventory management team to reduce inventory levels across businesses and regions, while maintaining the on-time delivery performance we had achieved. The effort included a two-day *Kaizen* (continuous improvement) event that dedicated time for employees to identify opportunities to reduce inventory throughout the supply chain and focused on reducing cash-to-cash cycle times. The team placed a heavy emphasis on the supply chains with the highest total cost of ownership and value stream mapped these areas to identify quick wins and project opportunities. As a result of the event, we identified several areas of key focus, including consignment inventory, potential use of distributors, inventory transfer practices with key suppliers, and reorder points within our ERP system. The event and the resulting projects helped to accelerate an inventory improvement effort and provided subsequent rapid improvements in inventory efficiencies and supply chain costs.

The management team also decided to modify its incentive compensation program for every business unit and functional area, placing an increased emphasis on working capital improvements, which also helped drive new ideas and encouraged global best practice sharing.

Progress was tracked with daily monitoring and reporting. By the end of 2008, inventory was down to historically low levels for the company. Internally we had numerous individuals who wondered whether maintaining those levels was sustainable; however, when we looked at stronger-performing companies, we realized we still had a long way to go. So, we stepped up our efforts.

Before January 2009 many of our inventory management systems had re-order points that had been on autopilot driven by Manufacturing Requirements Planning within SAP. As the demand plummeted with the economic downturn of 2008 and 2009, we turned off portions of our ERP system and moved to direct manual management of the material replenishment cycle. With this change, we more frequently reviewed the amount of material required to meet major fluctuations in customer demand patterns. As demand began to stabilize, we adjusted our planning horizons within the ERP system to provide for faster response times to demand variance. The project teams also reviewed all business processes surrounding make-to-stock (MTS) vs. make-to-order (MTO) and made adjustments to account for the new manufacturing footprint, improved inventory cycle times, and customer service requirements. The degree of flexibility within our manufacturing operations allowed us to move significant portions of our solutions portfolio into a MTO environment. This provided the added benefit of reducing our slow-moving finished goods inventory and diminished our inventory write-offs while maintaining high service levels.

From the second quarter of 2008 to the second quarter of 2009, inventory management actions reduced inventory levels by $152 million—freeing up much-needed cash while nearly doubling our inventory turns. (See Exhibit 1.)

The focus on inventory management is ongoing. During the company's global quarterly employee meetings, the CFO acknowledges the business units with the lowest inventory levels. The recognition has helped foster a spirit of competition aligned with achieving this important business goal. The inventory management team, now called the Global Sales and Operations Steering Committee, also increased the frequency of its meetings from monthly to weekly. The group's scope has widened to include demand forecasting, differentiated inventory strategies, and customer service level segmentation projects.

Process Improvements

Our focus on lean processes has resulted in a number of changes to address underperforming businesses or practices. These have predominately involved inventory management processes. The Global Sales and Operations Steering Committee also is responsible for implementing a three-year strategic inventory plan that will move our current level of performance to world-class. The committee's role is not only figuring out how to track performance (in many cases, these are metrics we were not looking at before), but also determining how to sequence the action plans to improve PolyOne's performance in each area. Areas that we're tracking include inventory levels in absolute dollars, slow-moving inventory, days sales of inventory, and on-time delivery.

We've implemented various process improvements in these areas, including adding inventory stratification processes to drive better analysis of which products should be made-to-order vs. made-to-stock. New processes already are starting to move PolyOne closer to world-class performance. For instance, we improved our four-month average DSI from over 55 days in the first quarter of 2009 to nearly 37 by the third quarter of the same year.

Greater Customer Focus

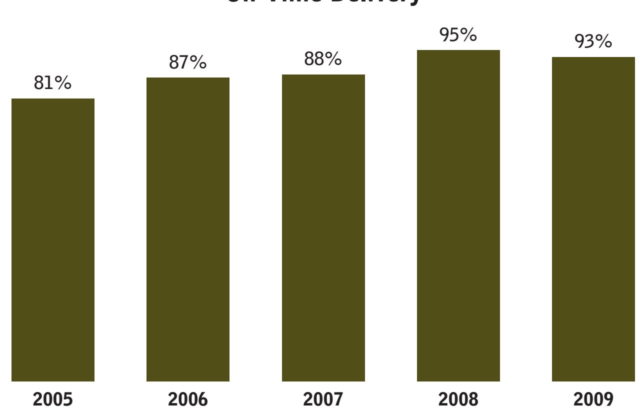
Every process and supply chain improvement effort is aligned to the voice of the customer. One of the most fundamental components of customer satisfaction for our business is the timely delivery of products to customers. Prior to 2007, on-time delivery was abysmal (even with warehouses full of inventory most of the year), and the results of a 2006 survey of our customers emphasized that on-time delivery was important to their businesses. Yet, prior to the first quarter of 2006, the company didn't even track it. When we began doing so, we found that we were delivering products on-time only 81 percent of the time. For our customers, that meant one out of every five orders was late.

At PolyOne, a product is considered on-time only if it is delivered in full by the date the customer asked for it to be delivered. To start fixing the problem, we first examined causes of delays (ranging from lack of capacity to lack of the right inventory) and addressed each specifically. Management also began to establish a clear mindset among employees that on-time delivery was critical. By the first quarter of 2007, on-time delivery performance had increased to 88 percent, and in 2009 it reached as high as 95 percent, which we consider best-in-class. Even as we reduced inventory and realigned our manufacturing, we remained focused on delivering products on-time to our 10,000 customers who operate in more than 130 countries around the world. Despite reductions in the size of our workforce and number of facilities—and with the changing demands of our customers, who were often making small, more frequent orders with less lead time—our global on-time delivery remained very strong in 2009. (Exhibit 2 shows the on-time delivery performance.)

The actions we've taken go beyond improving processes. PolyOne is also laser-focused on providing innovative solutions designed to create value and meet the emerging needs of our customers. And customers have noticed the shift. One customer recently sent us a letter compliment-

EXHIBIT 2

On-Time Delivery



- Dramatic improvement driven by a combination of action items and process improvement (e.g., Lean Six Sigma)
- Accountability for performance improvement at every level

Six Sigma at the Center

PolyOne's management recognized the need for leaner operations well before 2007. But like nearly everything else at the company, its approach to getting there was inconsistent. Rather than launching one companywide effort, management teams in three different regions each hired separate consulting firms to provide counsel on lean deployment. Neither group knew what the other was doing. The triplicate costs of the disparate efforts underscored the need for change.

Prior to Thomas Kedrowski's joining the company as head of Operational Excellence in 2007, lean deployment efforts had included only a limited amount of Six Sigma. Four months after his arrival, PolyOne began severing the three consulting relationships and focusing primarily on Lean Six Sigma (LSS), which Kedrowski and other new members of the management team were experienced in.

In early 2008, the company began applying LSS techniques to its manufacturing footprint analysis, and in August of that year launched a project focusing on inventory management and working capital improvement. Initially, employee interest in Lean Six Sigma was minimal, However, early successes with those projects—coupled with an LSS-driven manufacturing realignment—quickly pushed up enrollment in Six Sigma training.

In 2009, 600 associates underwent training. By the end of 2010, the company expects more than 25 percent (or 975) of its 3,900 associates worldwide to have completed training and 1 percent to have earned Black Belt certification. PolyOne's second class of Black Belts began formal training in January and the company's first class of Master Black Belts entered training in March of this year.

LSS techniques were applied to nearly 100 process improvement projects in 2009, and the company expects to tackle nearly 200 projects this year. While not all the projects have been related to the supply chain, LSS efforts have resulted in improvements in inventory management, on-time delivery, and other key goals.

In January 2010, the LSS deployment paid off in another way. The International Quality and Productivity Centre presented PolyOne with the Process Excellence Award for "Best Start-up Program" during its 11th Annual Lean Six Sigma and Process Improvement Summit in Orlando, Florida. PolyOne was selected from a pool of 400 entrants for the award, considered to be the most prestigious in the world for LSS.

ing our sales force and noting that PolyOne sellers have moved "from selling volume to selling value and solutions."

In keeping with that idea, we are currently developing a new business process to help us incorporate the voice of the customer. The goal is to improve our ability to identify and capture the unmet needs of our customers and then accelerate our company's capability to provide value-added solutions that satisfy customer requirements.

Key Contributors to Change

From my first meeting with Stephen Newlin, in 2007, I knew his senior management team was ready for change. The team understood which areas needed to be improved, and they were willing to invest the necessary time and resources required to transform the company. Their commitment remained strong even as the business and the broader economy began to show signs of the recession. That commitment continues to be the most important contributor to our success.

A second contributor is the internal talent of PolyOne. While the new management team injected new talent onto teams, existing employees stepped up in a major way, embracing the new efforts as well as lessons learned from Lean Six Sigma projects. (For more on the LSS efforts, see accompanying sidebar.) The combined result has been the ability to enact significant change while building employee morale and enthusiasm for improved business performance.

Finally, a third factor that has helped drive cultural change, in particular, is communication. We knew early on that employees initially would hear talk of implementing Lean Six Sigma as simply the "initiative of the year." So, our communication has stressed that this is a new way of doing business—not just the talk of the moment. Newlin recognizes the results of LSS projects during quarterly global employee meetings; we've used internal newsletters and our intranet to share benchmark data that helps employees see how we compare with our industry; and we've shared the stories of our early successes.

Lessons Learned

I came to PolyOne with a balanced background in both global business management and international supply chain management, developed over more than two decades at H.B. Fuller Company. Many of the issues that needed to be addressed at PolyOne were ones I had already faced in my career. However, even with this experience, our approach to solving problems over the past two and a half years has resulted in three key "lessons learned" for me:

1. Never underestimate the importance of communication and the visibility of success. PolyOne management realized early on that it needed to have consistent messaging around the importance of supply chain initiatives every step of the way. Having senior management sending those messages was critical to getting the focus needed to make change happen. Sharing success stories also boosted self-confidence among team members. As we started to generate stronger numbers, people were even more willing to take on projects and make suggestions that they would not have before.

2. *Information sharing and leveraging best practices around the world is critical.* We held global weekly meetings during which we had formally structured reviews of our progress in inventory management. We also tracked these metrics on shared files across a global network, providing real-time visibility to performance and project status. We would not have seen our progress to date if we had not done this.

3. *Common rewards and incentive plans help drive cross-business sharing.* Mindful that compensation structure helped create many of the problems with inventory, we determined that incentives and rewards would be needed to help drive solutions. Tying everyone's incentive compensation to global performance rather than solely to the performance of their own business units created an environment of cross-business and cross-functional sharing that accelerated our results.

More Room for Improvement

PolyOne is in a much stronger supply chain position today than it was three years ago. Actions taken to realign manufacturing and reduce inventory helped cut working capital and free up cash flow for paying down debt as intended. And improvements in on-time delivery and other key processes strengthened relationships with customers. While much of this was low-hanging fruit, the changes we've implemented so far demonstrate how properly managing the supply chain and operations can help a company manage through difficult times. Whether or not the economy improves soon, PolyOne is well positioned for growth and will be able to leverage its improved cost structure into improved profitability as demand increases.

Still, there is much more to be done. Despite management's commitment, the slow economy has meant that we've had to delay certain initiatives. While we completed nearly 100 process improvement projects in 2009, we expect to take on approximately 200 more in 2010. Specifically, we have identified six global programs that are currently in various stages of implementation or will be initiated by the end of 2010. And we will continuously look for new ways to improve our businesses.

The changes we've implemented so far demonstrate how properly managing the supply chain and operations can help a company manage through difficult times.

One change made earlier this year will help facilitate additional improvements and enable consistency in the way we serve global customers. As of January 1, PolyOne adopted a new organizational structure that globalizes the company's Specialty businesses along with its sourcing, information technology, human resource and finance functions. Announcing the changes to all associates, CEO Newlin noted, "We are organizing our company in a manner that provides the best of both worlds—globally organized business units with a consistent operating philosophy reaching the customer in a very local style, with local people."

Ten years after a consolidation created PolyOne, the businesses it cobbled together from acquisitions finally are centrally organized under a single global structure. This change and the other improvements we've made will help us better serve current customers and win new ones. Already, prospective customers are approaching us in their search for suppliers they can rely on, and they now see PolyOne as a partner who possesses the capabilities they require.

As the demand for quality and reliability in electronics, healthcare and other industries grows, we know the company is now well positioned to meet those needs. And that fits our ultimate goal: Everything we've done over the past three years begins and ends with better serving customer needs.

WHAT MAKES A WINNING S&OP

By Manoj K. Singh

There is simply no other word for it. The success rate of sales and operations planning (S&OP) programs has been dismal. A third of all S&OP programs fail or produce unclear results.

That is one of the most worrying findings from the survey that *Supply Chain Management Review* ran last year to better understand the impact of the recession from the viewpoints of supply chain executives. The survey, conducted on behalf of IBM and Oracle, showed that about 40 percent of businesses don't even have a formal S&OP program in place. And it revealed some staggering gaps in the participation of different stakeholders where S&OP processes do exist.[1] Nearly half of the supply chain managers polled conceded that they run their S&OP meetings without regular participation from their companies' manufacturing and finance departments. More than 50 percent do not involve anyone from marketing.

What's going on? After all, the S&OP process was designed around close collaboration between such stakeholders. The concept is simple: By regularly getting those who have the most visibility of demand at the same table with those who have the best insights into constraints on the supply side, companies are supposed to be able to build better supply chain plans and to collaborate more effectively to implement those plans.

The idea is not new: It has been around since the 1980s. If done right, S&OP has the potential to significantly improve some key operational metrics. According to the research firm the Aberdeen Group, companies that demonstrate best-in-class S&OP have 91 percent complete order fill rates and logistics costs of as little as 6 percent of sales. And their gross margins average 43 percent.[2]

So the basic question is this: Why don't companies adopt this apparently simple concept?

The simple answer is that most companies do "get" the concept, but they fall down on its execution. (See sidebar on "When S&OP Goes Wrong.") They focus on the details of operational process changes and technology enablement—for example, concentrating on the minutiae of calendaring monthly S&OP processes and spending inordinate amounts of time creating reports. While important, those tasks too easily obscure the fundamental factors that can make an S&OP program successful.

This article does not attempt to provide answers to the "what" and "why" of S&OP. It is our assumption that the rationale for instituting an S&OP process is widely understood. Instead, we want to focus on the "how"—the structural underpinnings of a successful S&OP program.

Five Ways to Get S&OP Back on Track

Our research on S&OP practices across a wide range of companies and industries point to five systemic flaws in how such programs are viewed and run. It is our belief that companies that want to benefit from the full potential of S&OP must fully address all five areas; short-changing even one of them could significantly undercut the effectiveness of an S&OP program. Let's look at each one in detail:

1. Make S&OP a Formal Functional Entity

A fundamental reason for S&OP's failure is that there is no formally defined "house" for it to reside within the organization; it is not recognized as a specific function in the way that finance and marketing are, for example.

At best, most companies set up small cross-functional S&OP teams. At worst, they cobble together ad hoc teams drawn from different functional groups. Even for

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PROGRAM

Although sales and operations planning (S&OP) has been practiced for several decades now, many companies still struggle to succeed with their programs. A big part of the problem is that the requisite building blocks to success are either faulty or lacking. The five success principles described here can get an S&OP program on the right track and delivering the kind of results expected.

the cross-functional teams that meet fairly regularly, the S&OP activities are usually their secondary job and in many cases, their after-office work. What's missing is the realization that S&OP, approached properly, involves so much pre-planning and follow-up activity that it requires dedicated effort and full-time staffing. At least as importantly, the S&OP program needs a formal structure and authority so that decisions can be made, communicated, enforced, and acted upon. In turn, a formal structure and declared roles and responsibilities necessitate clear guidelines for measuring performance.

In short, what is required is an S&OP function. It should integrate all the core and supporting functions that have an impact on demand-supply interactions. It should have a named leader who reports directly to the chief operating officer or an equivalent role to enforce

When S&OP Goes Wrong

At one large telecommunications solutions provider, the supply chain processes appear to be very well coordinated and managers confirm that they do practice S&OP. The quarterly financial plan takes into account the sales bookings forecast, the revenue forecast, and the order backlog. The supply chain operations team updates the operations plan to match the financial plan. The operations team executes the plan to meet the financial outlook. And data about bookings and revenues are very accurate.

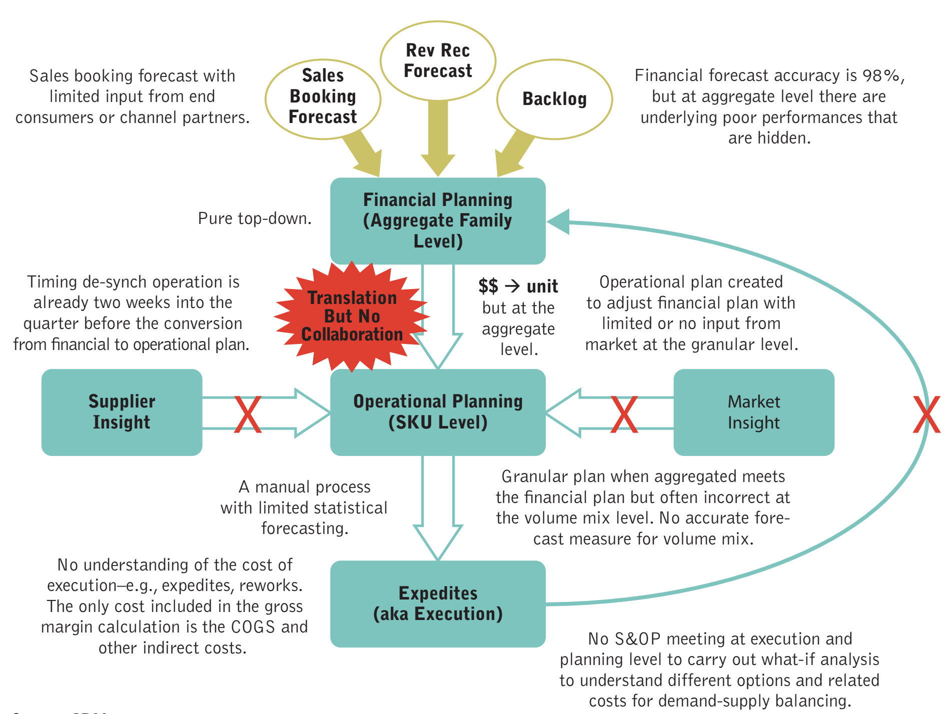
From an investor's viewpoint, the telecom provider is doing well. It has been growing at almost 20 percent year on year for some time, and its market share is as high as 40 percent. The company is in a high-growth market sector with relatively long product life cycles; most of its manufacturing is outsourced, and sales fulfillment takes place primarily through distribution and channel partners.

However, all is not well under the surface. Several financial and operational metrics tell a gloomier story. For instance, the company suffers from high expedite and operational costs. Its original operations plan assumes a 70/30 ship/air ratio from its Asia Pacific suppliers to its U.S. distribution centers, but in reality that ratio is 30/70. Moreover, inventory carrying costs are excessive, which is hurting profit margins. Inventory turns are quite low; even though the company does eventually sell everything it makes, it struggles to match customer needs and shorten its sales cycles.

Now too, competitors are beginning to catch up, making price points more sensitive and placing cost metrics higher on the financial dashboard. Overall, there is minimal collaboration among supply chain stakeholders. Sales booking forecasts have little input from distributors, let alone end customers. The operations plan is built to adjust to financial plan, but in many cases with no granular input from sales or marketing. There's no feedback loop from execution to planning. And there's no S&OP meeting at an execution and planning level to carry out what-if analyses that would help supply chain managers to understand the different options and associated costs for demand-supply balancing.

The list of challenges is long, as depicted in the exibit below. Essentially, the operations team is flying by the seat of its pants in trying to expedite to fulfill orders.

Potential Problem Areas



Source: IBM, 2007

the decisions made during the meeting. Above all, the S&OP organization must make sure that effort is managed as a continuous, real-time, cross-functional process rather than a set of episodic, point-in-time decisions.

Linksys built a formal S&OP function with those ideas in mind.[3] The Cisco subsidiary, a provider of networking hardware for consumer and small business markets, had no clear owner for its S&OP process. Its existing process was driven primarily by the demand forecasting and product management teams; attendance by other functions was sporadic and when representatives did attend, they were not always engaged. Consequently, there was nervousness about the demand forecast and production schedule. Also, demand forecasts were being updated at the last minute, production changes were being made inside supplier lead times, and freight was regularly expedited. This never-ending cycle led to excess inventory, higher supply chain costs, and poor customer satisfaction.

Mark Payne, Linksys' vice president of worldwide operations, instituted a new structure around S&OP, with a clear mission and defined roles and responsibilities. (See Exhibit 1.) The former global forecasting team now leads the process. Its members keep their forecasting roles but they now have broader responsibilities that include S&OP planning. Payne also demanded accountability across the different functions; participants are expected to be knowledgeable and aware of the issues in the business.

Linksys has achieved impressive results to date—many of which were delivered in less than a year. Overall inventory levels fell by more than a third, and expediting dropped from more than a third of all shipments to just 3 percent. Excess and obsolete inventory was cut by 40 percent, and supplier fill rates were boosted from 65 percent to 95 percent.

2. Put S&OP on the Executive Agenda by Analyzing the Financial Implications

Typically, S&OP-related activities are relegated to operational levels. In itself, that is not a bad thing, but it means that S&OP doesn't get the strategic attention it deserves. Unless and until the practice is on the agenda of a chief financial officer or chief operating officer, it cannot become part of the company "DNA."

S&OP processes need to be driven top-down, with their financial and business implications made clear and every decision tied to the company's strategic objectives and financial metrics. So instead of S&OP discussions working through the typical hierarchy of meetings—bottom-up data in daily meetings feeding into weekly meetings that feed into monthly and then quarterly business meetings—it should work the other way around. Every S&OP discussion should start and end with financial metrics that are driven by senior management. (See Exhibit 2.)

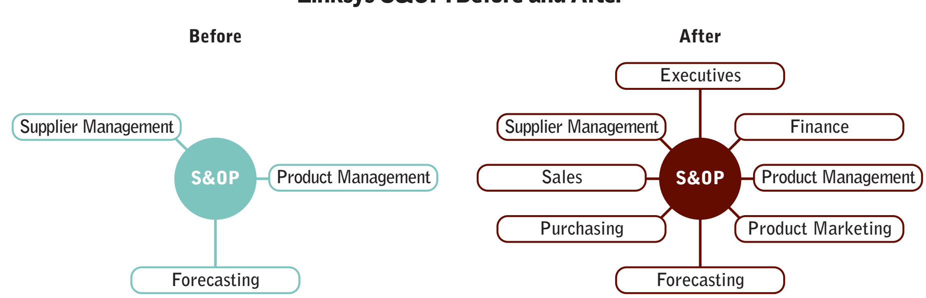
This requires detailed "action" and "metrics" mapping along with a metrics hierarchy to create a bidirectional link between operational and financial metrics. Imagine that the COO examines the financial metrics and initiates a root-cause analysis when she picks out a significant deviation in, say, the use of working capital. The operations team then digs into the root cause to unearth a fulfillment problem, for example. Then the team sets out several options for resolution of the problem, weighing the options against the financial implications, and—depending on the severity of the required change—seeking approval from top management. The last step sees the team resolving the problem satisfactorily.

Of course, most S&OP decisions won't require senior management's sign-off. But each one must be backed by an analysis of the financial implications. Take, for example, the decision about whether to substitute an out-of-stock item with an expensive item to fulfill a customer's order. Usually the sales representative will make this decision based on what he knows about product availability, without much consideration of the impact on margins.

What should happen is an analysis to ascertain the profitability of the decision. The core question is: "When, in the event of a stock-out, is it profitable to substitute a low-end product with a high-end one?" The answer lies in the fact that the propensity for substitution increases as the price differential between the high-end and low-end products decreases. But if at the same time there is greater probability of demand for the high-

EXHIBIT 1

Linksys S&OP: Before and After



end product—if its forecast numbers are high—then the propensity for substitution is lessened.

3. *Start with a Balanced Demand-Supply Plan—at the SKU Level*

There are two distinct stages in an S&OP cycle. The first is the planning stage—typically a quarterly cycle—where companies try to arrive at a "single" plan agreed to by all the stakeholders. The second is the operational stage, also occurring during the quarter, where companies try to balance demand and supply as orders start to arrive and as they make a start to manufacturing, procurement and fulfillment against those orders. The two stages themselves are often out of balance.

Companies tend to spend an enormous amount of time and effort on the operational stage when in reality demand and supply are frequently out of balance in the planning stage—as seen, for example, with flawed product mix planning. At a leading telecom equipment provider, the operations group creates a bottom-up plan using sophisticated forecasting tools based on historical shipments at the SKU level. However, after the numbers are rolled up to the aggregate product level, there is always a mismatch between the bottom-up operational plan and the top-down financial plan. As happens at this point in many organizations, the equipment maker's top-down financial plan takes precedence, and the bottom-up operational plan is changed by altering the product mix to match the financial plan.

To make matters worse, if sales or marketing have not provided their insights, the plan is as unrealistic as it is unbalanced. So it is no wonder that when implementation begins, the plan is thrown aside and people fly by the seats of their pants to meet demand. (See sidebar, "When S&OP Goes Wrong.") What's required is a two-way collaboration to take into account the realistic operational picture and to reconcile with the financial numbers.

The second reason why the initial plan is usually unbalanced relates to a lack of demand and supply data at the SKU level. The sales team tends to provide information only at the aggregate level and at times only at the financial level. Take, for example, a sales person responsible for selling PCs to a university who provides her financial forecast without breaking it down by desktops, laptops, and other handheld devices. In fact, salespeople often do have richer information—even if it is "back of the envelope"—about what SKUs they plan to sell and what the mix will look like, broken down by products and customers. The tendency is to hide those levels of granularity in order to have the flexibility to make changes later. But when aggregated across large numbers of sales forecasts, this behavior can significantly impair the overall plan.

The data-sharing processes should be streamlined so that every stakeholder has a view of the demand information, preferably at the SKU level—and can provide input at that level of detail.

4. *Apply Performance Management Measures*

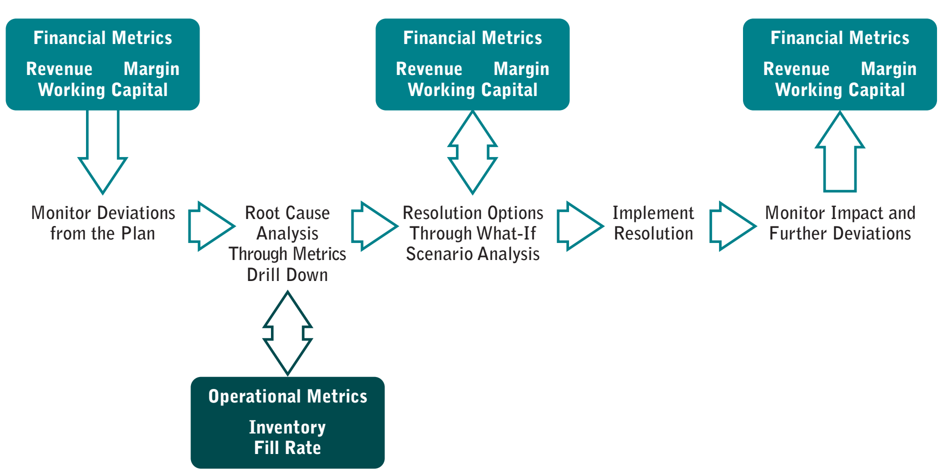
Behavior is driven by performance frameworks and by metrics. Salespeople are measured on new signings and revenue; operations people are measured on fulfillment and cost.

There is a fundamental disconnect here. There can never be real discipline in the demand plan unless those responsible for demand are also made accountable, to some extent, for the costs that the forecast produces in the supply plan. In other words, sales must be held responsible to a degree for the costs associated with inventory and expedites that are typical consequences of poor demand planning. Salespeople should be incentivized to care about actual margins.

To be clear: These days, many do have margin incentives in place, but they are not held accountable for the inventory outcomes of flawed S&OP decisions. And it is those elevated inventory levels that eat into margins. We know of some far-sighted companies that are tying their salespeople's total compensation to the margins

EXHIBIT 2

S&OP Process Begins and Ends with Financial Metrics

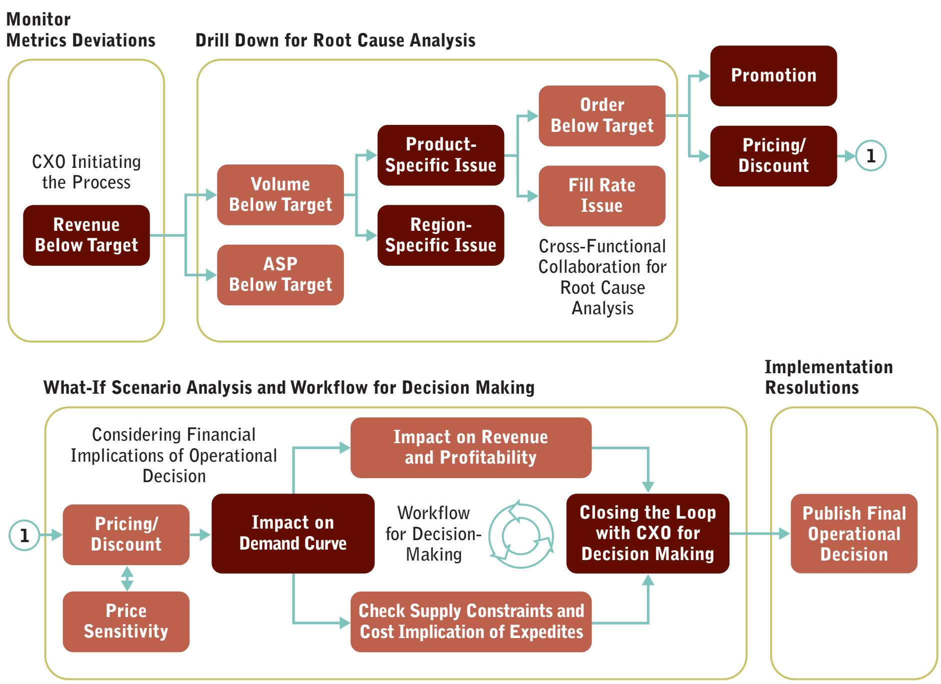


realized after execution of the S&OP processes.

The lack of sales participation in the S&OP process is a big problem. Many salespeople argue that the uneven nature of demand makes it impractical to predict so there's not much merit in them participating in S&OP discussions. They often contend that it makes more sense to create statistical forecasts based on historical demand and then make adjustments as the reality unfolds. That argument holds good up to a point. Examination of the data shows that a portion of demand is always known to sales with some level of confidence, and that information can therefore be predicted and communicated. When that happens via a formal and periodic collaborative S&OP process, the part of demand that truly is unpredictable will gradually decline.

EXHIBIT 3

Example of S&OP Playbook Showing Revenue Below Target



5. Use a Playbook to Establish the Demand-Supply Balancing Process

Traditionally, companies use a lot of "tribal knowledge" during S&OP meetings to manage demand-supply balancing. Typically, the company's planners—especially those who are longtime employees—are driving those discussions. Although these approaches may be quite effective, they are not tenable over the long term because they are high-risk and they are not scalable. If a veteran planner leaves the company, a lot of institutional and process knowledge goes with him.

For those reasons, supply chain leaders will do well to use predefined, documented playbooks to manage their formal demand-supply balancing processes. The playbooks should cover most of the scenarios that the company encounters during its supply and demand fulfillment operations. The playbook approach brings consistency to decision-making, cuts the time it takes to make decisions in S&OP meetings, and lays the foundations for measuring the effectiveness of decisions and for building continuous improvement into the process. In all cases, the playbook is rooted in the financial metrics. (Exhibit 3 gives an example of a playbook on revenue targets.) Several major technology companies—specifically the personal computer manufacturers such as Dell — have done extensive work in formalizing S&OP playbooks, and they use them consistently.

Long-term Effort

Instituting an S&OP program involves much more than setting up a few periodic meetings for demand-supply balancing. S&OP is at the core of a company's strategic, financial and operational performance and as such, it requires a much broader mandate in the organization.

The journey begins with senior management's realization of the need to form a discrete S&OP function. It starts to gather momentum when there is a performance framework that fosters collaboration and accountability. For many organizations, the sooner that journey begins, the better.

Sources:

1 SCMR Research - http://www.oracle.com/global/uk/scm/documents/oracle_ibm_recession_survival.pdf, January 2009

2 Executive Sales & Operations Planning: Process and Technology Strategies, Aberdeen Group, June 2007

3 "Linksys Streamlines Supply and Demand Chain to Achieve Operational Excellence While Fueling New Business Growth," Cisco Systems press release, 2008

Putting the Structure in

By William B. Lee and Errol Wirasinghe

Many supply chain managers make the critical error of equating making decisions with solving problems. Decision making is not problem solving. Decision making is specific to the person. Problem solving is specific to the problem. Our work suggests that problem solvers are not necessarily the best decision-makers, and perhaps vice versa.

We have all heard jokes like, "to a surgeon, cutting can fix anything" or "to a chiropractor, manipulation can fix anything" or "to a psychologist, everything's mental." These jokes are, of course, not fair to those professionals, particularly the good ones. But don't we have the same sort of phenomenon with our supply chain decision making? Some will advocate that "lean can fix everything" or that "everyone needs to do Six Sigma." Again, we don't want to criticize the advocates of those techniques, just as we don't want to disparage surgeons or chiropractors or psychologists. It's just that we need to take a longer, more analytical look at our supply chain decisions and not simply jump in with the latest buzz word. We believe one of the reasons companies have so much trouble with their supply chains is a lack of a structured decision-making process.

Many surveys have shown that an overwhelming majority of professionals indicate that they rely on "common-sense and gut-feel" interpretation of data and subsequent decision making. They are inconsistent in how they approach decisions, and yet they frequently institute rules in an attempt to be more consistent. They also systematically distort certain pieces or types of information. The result of these decision-making approaches typically is that the same situation presented repetitively yields different decisions. Furthermore, these decisions rarely are anywhere close to being optimal.

This is pretty sad. Clearly, we are not going to do much to fix this situation with this one article, but maybe we can help. Many good books have been written on decision making; two of the best are David C. Skinner's *Introduction to Decision Analysis*[1] and Errol Wirasinghe's *The Art of Making Decisions*.[2] Our objective is instead to highlight the role of decision-making processes, analysis, and models in supply chains.

Specifically, we offer seven steps to a more structured approach to supply chain decision-making:

1. Frame and describe the situation about which a decision is to be made.
2. Define the objective(s) of the decision and the criteria that define the objectives.
3. Extract obligatory criteria.
4. Creatively identify decision options that meet all obligatory criteria.
5. Gather information on decision alternatives, and develop the judgment table.
6. Assign weights to the obligatory criteria.
7. Rank alternatives.

To illustrate the use of such mod-

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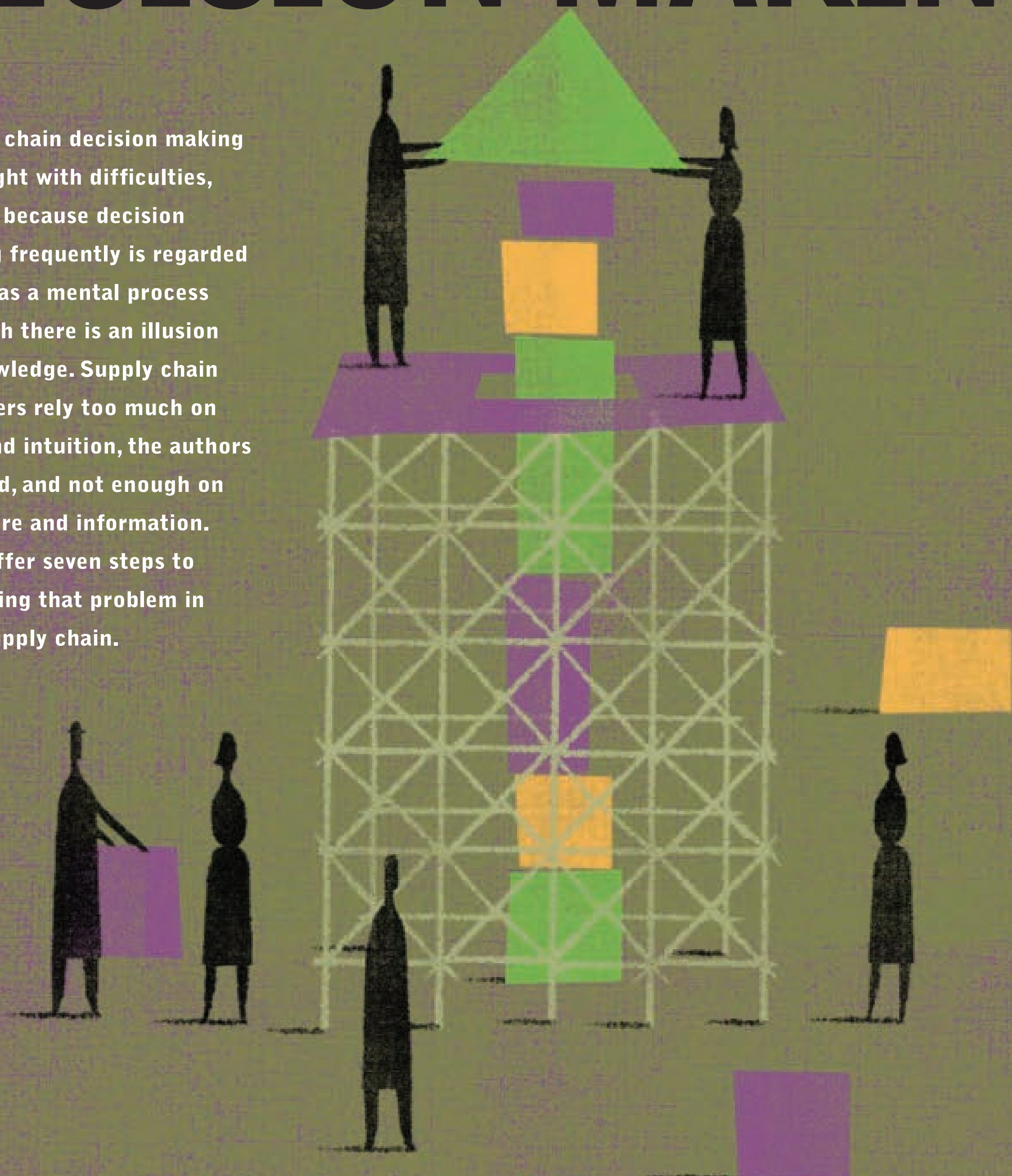
DECISION MAKING

Supply chain decision making is fraught with difficulties, largely because decision making frequently is regarded purely as a mental process in which there is an illusion of knowledge. Supply chain managers rely too much on guts and intuition, the authors contend, and not enough on structure and information. They offer seven steps to improving that problem in your supply chain.



els, we like the old quote: "All models are wrong, some models are useful."

What are the implications of this quote—especially in this context of supply chain decision making? There are many, and we will explore some of them in the discussion that follows.

Complexity Drives Decision-Making

Readers of *SCMR* likely will agree that most supply chains are complex, particularly as they extend past suppliers to suppliers' suppliers, and past customers to customers' customers. Most companies also have multiple supply chains, which add additional complexity. In many industries, supply chain management perhaps is the single most important driver of the company's success and the single most difficult area of decision making.

Complexity drives uncertainty and risky environments for the decision maker. Uncertainty of demand and supply, uncertainty of the global business environment and many other uncertainties are prevalent. Risk of product failures, of customers or suppliers going out of business, of financial meltdowns—and many other risks also are widespread. Decision makers need to deal with all of these issues.

Importantly, please also recognize that relying on financial data alone can lead us to sub-optimal decisions. The message here is that we need a robust technique for handling multi-criteria decision making, and for validating decisions. A robust technique is one that is straightforward and that is difficult to misuse to get the wrong answer. The "guts and intuition" approach to decision making, by contrast, can easily lead a person or an organization astray.

The theory and practice of decision making (or "decision theory") classifies decisions as follows: decision making under certainty (DMUC), decision making under uncertainty (DMUU), and decision making under risk (DMUR). Decision theory contains well-known approaches to each.

When we know for certain the outcome associated with each decision alternative, it's called decision making under certainty. Some, but not many, supply chain decisions fall into this category—mostly short-term decisions. Of course, how certain is certain? No decision outcome is really certain, as we say, down to the 47th decimal place! Scheduling decisions, for example, sometimes might be considered relatively certain. When you place an order with Dell, they promise delivery of a computer in a certain number of days after your order, and it's there right on schedule with very little variation from one customer to another. Dell has made their mastery of the supply chain a real competitive advantage in the marketplace. FedEx is another example of a company that can promise delivery with some degree of certainty.

When a decision alternative can result in more than one possible outcome, along with an uncertain probability of occurrence, then we call it decision making under uncertainty. However, when we know the probability of each possible outcome, we call it decision making under risk. But, you argue, isn't our knowledge of the probabilities really just a guess and really a continuum? In most cases, that is true.

Many surveys have shown that an overwhelming majority of professionals rely on "common-sense and gut-feel" interpretation of data and subsequent decision making.

Consider a simple example. Say, we have a supply chain decision about a possible new supplier with two possible outcomes: "successful choice" or "unsuccessful choice". If we really do not know the true probabilities for either, we may choose to assign a 50/50 likelihood. But this really is a "perception-driven interpretation." Maybe it's 60/40 or 40/60. Or, maybe it's a normal distribution with a mean of 50 percent and a standard deviation of 10 percent? We have just turned DMUU into DMUR or, perhaps, into a continuum DMUR.

Case Study: Decisions Under Risk

In supply chain decision making, DMUR likely is the most prevalent condition. Let's look at a real case of a large lubricants company. We have disguised the case for use in our MBA and executive education teaching. Further, for this article we obviously have simplified the details of the case while nevertheless retaining the essence of the decision problem.

One of the company's specialty lubricants plants is experiencing a substantial increase in business. Feedstock supply is not an issue. The plant is an essential element of the company's supply chain as well as of its customers.' The company is considering three courses of action:

A. Subcontract for additional capacity
B. Construct new plant
C. Do nothing (no change)

Demand may be low, medium, or high with probabilities estimated to be 10 percent, 50 percent, and 40 percent respectively.

The company first is interested in the financial impact of the decision. It can estimate the net present value of profits from the three alternatives (A, B, and C) under the differing levels of demand. This is the "Payoff Matrix" shown in Exhibit 1. Several criteria can be used to make the decision regarding which of the three alternatives to choose.

EXHIBIT 1

Payoff Matrix

Demand	Low Demand	Medium Demand	High Demand
Probabilities of Demand	10%	50%	40%
Decision Alternatives	Net Percent Value of Profits from the Decision		
A. Subcontract of Additional Capacity	$10m	$50m	$90m
B. Construct New Plant	-$120m	$25m	"Maximax" $200m
C. Do Nothing (No Change)	"Maximin" $20m	$40m	$60m

The Maximin Criterion. Maximin is a criterion of extreme pessimism. It attempts to maximize the minimum possible gain. This is done by determining the smallest possible gain for each alternative if the worst possible event occurs. The alternative is selected that has the best outcome under the poorest conditions—the maximum of the minimums. Under this criterion, the best choice is C with a return of $20 million. The minimum for A is $10 million, and for B it is minus-$120 million.

EXHIBIT 2

"Regret" Matrix

Demand	Low Demand	Medium Demand	High Demand
Decision Alternatives	Net Present Value of "Regret" from Decisions		
A. Subcontract of Additional Capacity	$10m	$0m	"Minimax Regret" $110m
B. Construct New Plant	$140m	$25m	$0m
C. Do Nothing (No Change)	$20m	$10m	$140m

The Maximax Criterion. This is the criterion of extreme optimism. Its objective is to select the decision alternative that will provide the maximum possible return, regardless of the associated probabilities. Under this criterion, the best choice is B with a maximum return of $200 million—the maximum of the maximums. The maximum for A is $90 million, and for C it is $60 million.

The Minimax Regret Criterion. "Regret" is synonymous with the opportunity cost of not having made the best decision for a given outcome. It follows that the decision maker would like to make a decision that minimizes regret. This is the "Regret Matrix" shown in Exhibit 2. Say, "high" demand occurs, and the payoff from decision A would have been $90 million, the payoff from decision B would have been $200 million, and the payoff from decision C would have been $60 million. The "regret" from A would have been $110 million ($200 million minus $90 million). This is the "minimax regret" (the minimum of the maximum regrets) choice.

The Expected Value Criterion. This criterion weights the outcomes by their probability of occurring. For example, using the payoffs and probabilities cited above, the expected value for decision A is $62 million ($90 million x 0.4 + $50 million x 0.5 + $10 million x 0.1). This is shown in the "Expected Value" Matrix in Exhibit 3. The maximum expected value is $80.5 million, decision B.

We often ask questions such as the following: "Given the information as presented, what would you do with the lubes plant decision and why? Especially since all three alternatives were chosen under different decision criteria." And what about the model? In what ways is the model an abstraction from reality, and what difference does it make? What additional information would you want if this were your decision?"

There are many ways we can make this model more complex and thus more "realistic." One example is sensitivity—we could test the sensitivity of the decision to the probability estimates, to the payoff estimates, and even to the decision alternatives themselves. Another example of additional complexity is with Alternative B: "What size of a new plant should we construct—small, medium, large, or very large?" Any number of additional complexities could be added to the decision.

So, what has this revealed? We have used this simplified (but realistic) example of a supply chain decision

EXHIBIT 3

"Expected Value" Matrix

	Expected Value
A. Subcontract of Additional Capacity	$62m
B. Construct New Plant	Maximum Expected Value = $80.5m
C. Do Nothing (No Change)	$46m

with three choices. By applying some very commonsense financial decision rules, all three choices have been shown to be reasonable under different decision criteria.

What's a supply chain manager to do? To try to put some light on this subject, let's look into some key supply chain decisions that need to be made and a structured approach for making them.

Key Supply Chain Decisions

It is useful to consider ways to classify supply chain decisions so that we can apply decision-making processes appropriately. One of the most effective classifications was presented by David Simchi-Levi and his co-authors in *Designing and Managing the Supply Chain*.[3] The following is adapted from that work:

1. Strategic decisions have a long-lasting (one to ten years typically) effect on the organization. These include target customers and their characteristics, product and service selection and design, distribution network configurations such as numbers and locations of facilities, structure and processes of the supply chain, supplier relationships, and so forth. Since these decisions are both long lasting and typically of great consequence, more time, effort, and formality usually are taken in the decision process. The lubricants plant above is an example of a strategic decision.

2. Tactical decisions include decisions that typically can be updated anywhere between quarterly and yearly. These likely include purchasing and supply contracts, production decisions, inventory policies, sales and operations planning, and so forth. These decisions are important but reversible in the intermediate time period. Thus, they would deserve some intermediate level of formality in the decision making process.

3. Operational decisions refer to day-to-day decisions such as scheduling, quotations, transportation, and so forth. These decisions typically last only a short period of time and are of little consequence if wrong. Thus, people likely will spend relatively little time or resources in making them individually. However, management frequently develops decision rules that apply to an entire class (say, quotations) of these decisions. For example, quotation decision rules may be something like "take the product standard cost and add a 40 percent markup for the price."

Structured decision processes, the focus of our discussion, usually deal with strategic and tactical decisions.

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The Structured Approach

Many of us are accustomed to making decisions on the basis of quantitative data. The rate of return on a project, or the expected demand for a product, are easily explained in terms of numbers. In the above example, we developed a payoff matrix and applied financial criteria to the decision. But this is just one criterion. In the real world, there are many factors at play; these are what we refer to as "criteria."

Inherent in many supply chain decisions are factors such as company strategy, competition, customers, suppliers, bureaucracy, language barriers, governmental issues, and so forth—all of which are qualitative in nature. Thus the subjective human being (the decision maker) adds inevitable biases when he or she includes certain criteria, and excludes others.

To most people, a good decision is one that produces the desired outcome. Unfortunately this is a very limited definition. David Skinner makes a good point about outcomes and the relative desirability of possible outcomes.[1]

"Outcomes are what can happen. As an example, if you were going to have heart surgery, the outcomes could be:

- complete recovery, no side effects,
- partial recovery, some side effects, or
- death."

Clearly, we all would have our preferences about the outcome! So part of having a robust decision making process is a strong linkage of the decision(s)—say, not only whether to have heart surgery, but whom to choose as the surgeon, where to have the surgery, and the surgeon's decisions before, during, and after surgery—to the possible outcomes. We all know that different surgeons and different hospitals have different outcome probabilities. We want to weigh these in our decision process.

The quality of the decision will depend on a number of things: the decision alternatives, decision criteria, available data and information, context and domain of the decision, analysis techniques used, the expertise of the decision maker, and so forth. However, the outcome of the decision will, additionally, depend on appropriate timing, adequate resources, commitment to execution, and changing circumstances, among other factors.

As an alternative to gut-feel and pure common-sense techniques, we offer a seven-step process to making solid, structured decisions. We will discuss the steps in terms of the previous example. This approach is invaluable when we deal with qualitative information and criteria.

1. Frame and describe the situation about which a decision is to be made.

We paraphrase a famous anonymous quote: "A decision well framed is half made." The first step is to define the decision in light of the company's strategy, along with the decision's boundaries, interfaces, and influences. Strategic thinking drives decision making by:

- Setting strategic direction for the business.
- Establishing the objectives to deliver results.
- Creating measures to track progress toward objectives.
- Specifying behaviors that are required to implement the strategy.

Each of these is important as we frame our supply chain decisions.

2. Define the objective(s) of the decision and the criteria that define the objectives.

Objectives must be stated in unambiguous terms. Additionally, they should be time-bound, and progress must be measurable. In the earlier lubes plant example, we may have an objective stated as: "Determine the best option to meet the expected demand growth for the next five years." Wherever possible it is essential to have a statement (such as this one) that would allow us to measure progress in terms of achieving this objective. Thus, if the expected progress is not being achieved, we can take corrective measures in a timely manner.

Criteria explicitly define the objectives of the decision. As we structured the problem previously, the payoff matrix is just one criterion—financial. Most supply chain decisions (and most others for that matter) are multiple-criteria decisions—meaning that there are multiple objectives which the decision needs to achieve. The financial payoff matrix indicated no clear preferred option, but we would have needed to consider other criteria anyway. These could be, for example, the following four additional criteria.

- *Strategic fit.* How well do the candidate decision alternatives fit with the company's strategic direction? Does the company prefer outsourcing or not outsourcing? Does the company prefer to own excess capacity or to be tight on capacity?
- *Management capability.* Does the company have the necessary management capability to implement the options? If outsourcing is unfamiliar to the management

team, this may be a difficult alternative to implement.

• *Risk.* Do the options present unacceptable risk to the company—defined in whatever way the company deems useful? For example, part of a robust decision process likely should be the possible environmental risk.

• *Customers' needs.* How well do the alternatives fit the needs of the customers?

3. Extract obligatory criteria.

With criteria, more is not merrier. As we add more criteria, the significance of the existing criteria is diluted. More than about 10 criterion require some sort of prioritization to extract the obligatory criteria simply because we may not be able to deal effectively with that many choices. The remaining criteria may be desirable or nice-to-have but not necessary. If there is a tie between the top two candidates, then we may revert to these desirable criteria to make a final decision.

The Analytic Hierarchy Process[4] (AHP) is a structured pair-wise comparison technique for dealing with complex decisions. Rather than prescribing a "correct" decision, the AHP helps the decision makers find the one that best suits their needs and their understanding of the problem. Several firms supply computer software to assist in using the process. AHP is beyond the scope of this article, but we wanted to introduce the idea and suggest that our readers go beyond the present discussion in this important area.

We need to take a more analytical look at our supply chain decisions, not jump in with the latest buzz word.

4. Creatively identify decision options that meet all obligatory criteria.

We have already identified the decision alternatives: sub-contract, build a new plant, or do nothing. Although we noted that each of these could be expanded into numerous sub-options such as build a small plant, or a medium-size one, or a large one, or on and on. We thus could build a hierarchy of decision options. Such a hierarchy can be analyzed using AHP. As to the "creative" approach, Errol Wirasinghe, in his book, says it well:

"The role of creativity is that of generating and identifying options with which to solve a problem. … Creativity consists largely of rearranging what we know in order to find out what we do not know. A pile of rocks ceases to be a rock pile when someone contemplates it as a cathedral."[2]

5. Gather information on decision alternatives, and develop the judgment table.

This is where we note the pros and cons pertaining to the criteria, for each of our candidates. The quality of our final decision will depend on how much effort we dedicate to the task. Do not skip this step; without adequate information about the candidates, we cannot make a reliable decision.

6. Assign weights to the obligatory criteria.

All criteria do not have the same significance. We may run an AHP evaluation to assign criteria weights. There is a danger in using common sense because you may become a victim of "hidden traps" in decision making as outlined in a 2006 *Harvard Business Review* article on the subject that we highly recommend.[5] The article mentions several types of traps, but postulates that what makes all of them so dangerous is their invisibility. Because they are hardwired into our thinking process, and thus our common sense, we fail to recognize them—even as we fall right into them.

7. Rank alternatives.

Ranking alternatives typically begins by discarding those that appear obviously inferior. In the lubes example, we intentionally did not include any inferior alternatives. Then, we run a pair-wise analysis on the decision alternatives using our judgment table. The decision maker systematically evaluates the various alternatives by comparing them to one another two at a time. That is, we compare subcontracting with building, subcontracting with doing nothing, and building with doing nothing. In making the comparisons, the decision makers can use concrete data, or they can use their judgments about the options' relative meaning and importance.

To validate the decision, we described the decision situation, decided which criteria are relevant; and assigned weights to these criteria to reflect their significance. At this point, we need to ask, Did our "human feelings" overly bias the decision in favor of some alternative? These may be some of the decision traps mentioned above.

Another very relevant validating question is: Will the winning candidate be valid if we were to remove any particular criterion? We then remove one criterion at a time and see its impact on the decision. Clearly, if we remove any single criterion, then we must re-evaluate the weightings of the remaining ones.

Next Steps

The reader should be aware of one caveat—we cannot possibly cover the subject of supply chain decision making in one short article such as this. Countless articles and books have been written on the subject of decision making alone, without adding the difficulties of supply chains. We thus have chosen to take a very narrow slice and not try to deal with such a complex subject in anything near a complete manner.

Our objective here has been to encourage the readers to consider how to structure decisions so as to improve their decision-making process. We have examined the dynamics of the decision process—the "how" and "why" of decision making—and have explained some elements of the structuring process. We also have shown how one approach (the financial one) easily can provide conflicting results and why most decision situations are multidimensional.

The example of the lubes plant shows a common structure of the financial role in the decision process—we can say (tongue firmly placed in cheek), "you tell me the answer you want, and I'll tell you what criterion to use!" We could expand this little statement to say that we also can manipulate the payoff matrix to give you the answer you want. But, that's not fair is it?

So, our message is to be careful about how you define the decision under consideration. We feel making use of the seven steps described here is the best way of helping to ensure a robust decision-making process.

End Notes

1 Skinner, David C., Introduction to Decision Analysis: *A Practitioner's Guide to Improving Decision Quality*, Second Edition, Probabilistic Publishing, 1999.

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3 Simchi-Levi, David, Philip Kaminsky, and Edith Simchi-Levi, *Designing and Managing the Supply Chain: Concepts, Strategies, and Case Studies*. McGraw-Hill Irwin, 2008.

4 See Wikipedia article on "Analytic Hierarchy Process" for an introductory explanation and other references. (Accessed February 2010).

5 Hammond, John S., Ralph L. Keeney, and Howard Raiffa, "The Hidden Traps in Decision Making," *Harvard Business Review,* January 2006.

Are you a Sophisticated Practitioner?

By Peter Duchessi and InduShobha Chengalur-Smith

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Conventional wisdom is that most companies today, particularly the larger ones, have adopted the practices associated with sound supply chain management. But that may not always be the case. New research reveals a clear gap between adopters and the laggards—or the "sophisticated" and "less sophisticated" practitioners. This article explains wwhat differentiates the two groups on key dimensions, and tells what you can do enhance your level of sophistication.

Modern supply chains are networks of material and information flows from raw material suppliers to end users. Many companies today participate in multiple supply chains, as determined by their mix of products and services. Knowledgeable professionals and academicians for some time now have recommended certain supply chain management (SCM) practices to effectively manage the supply chain flows. These practices include, for example, collaboration, performance measurement, and implementation of pertinent information systems such as transportation and warehouse management systems (TMS and WMS). If properly applied, these proven practices bestow supply chain competencies that result in valuable business benefits. Recent studies, however, have revealed a patchwork pattern of adoption of these practices and a modest uptake overall.[1]

One new study conducted among manufacturers by the authors confirms that many companies may not be as advanced in their SCM practices as publications and academicians have led us to believe. In particular, our survey findings reveal that the adoption of highly recommended SCM practices is less than 100 percent. The findings further identify two distinct groups of companies—what we term the "sophisticated" and the "less sophisticated" practitioners. Sophisticated practitioners, overall, use the recommended practices to a greater degree than less sophisticated practitioners. Notably, the distinctions between the two groups are most apparent across three dimensions of SCM practice that are critical to business success. These are supply chain design, vendor managed inventory (VMI) programs, and information technology (IT) investment.

Our findings are especially surprising because the survey participants are large, international companies belonging to the

findings in each of these areas, noting in particular the actions and attitudes that lead to success as well as those that impede progress. The article concludes with a summary of the findings and a list of directives that practitioners should consider to advance their supply chain competency and become more "sophisticated" practitioners.

upper quartile of Fortune's top-100 list. (For more on the survey, see accompanying sidebar). Apparently, there are opportunities for supply chain improvement in even the largest, most successful companies operating today.

This article shares the results of our survey on the uptake of recommended SCM practices among manufacturing companies. We begin by examining the relationship between the desire to optimize (enhance) supply chain performance and specific improvement activities around the dimensions of supply chain design, VMI programs, and IT investment. We examine the

Key Dimensions of SCM Practice

A widely accepted best practice is that companies need to pursue supply chain performance optimization as an overarching strategy. (Here, optimization is interpreted as a positive, factor improvement in supply chain performance rather than true optimization in the operations research sense.) Concerning this strategy, just over 86 percent of the companies surveyed intend to optimize their supply chain performance, with 63 percent indicating they are doing so to gain a competitive advantage. A company's strategy to optimize supply chain performance should drive its decision making across the three dimensions of SCM practice cited above—namely, supply chain design, VMI programs, and IT investment. As empirically demonstrated in prior research, good or best practice in these areas provides important supply chain competencies, including improved supply chain integration, closer cross-company collaboration, and better supply chain visibility. Further, best practices result in valuable business benefits, including improved customer service, increased sales, and reduced operating costs.[2]

Supply chain optimization cannot be achieved without appropriate investment. The survey's findings discussed below show that many—but certainly not all—companies are investing aggressively in supply chain redesign with a focus on collaboration, VMI program implementation, and IT. Clearly, those companies that are genuinely striving to optimize supply chain performance do not hesitate to spend money on implementing practices that will provide them, and presumably their suppliers/customers, with important competencies and valuable business benefits.

There are opportunities for supply chain improvement in even the largest, most successful companies.

Supply Chain Design and Collaboration

To effectively develop and deliver products and services, companies need to integrate their supply chains. Integration is the effective coordination of supply chain processes. Improving integration often requires that companies redesign their supply chains. Of the companies that intend to optimize supply chain performance, exactly two-thirds have redesigned their supply chains to integrate with suppliers and customers. Integration requires considerable collaboration among supply chain participants. Supply chain collaboration, in turn, requires that personnel, within a company and across companies, assume new roles and responsibilities. Determining who does what, when, and where requires temporary and permanent organizational arrangements that allow input from both suppliers and customers.

The companies that seem to do the best job here implement an organizational arrangement that enables regular and open dialogue so that continuous supply chain improvement becomes an ongoing initiative. In fact, of the companies that have redesigned their supply chains to effectively integrate with suppliers/customers, 87 percent jointly determine new supply chain roles and responsibilities with their supply chain partners; 74 percent change the roles and responsibilities of purchasing personnel; and 76 percent create a cross-company team to actively manage supply chain processes (see Exhibit 1).

The leading companies are taking a team-based approach to company and cross-company initiatives to redesign their supply chains, foster supply chain collaboration, and manage ongoing supply chain activities. On that last point, by having a dedicated team to manage ongoing supply chain activities, companies will be able to sustain supply chain modifications and continuously improve their supply chains over time.

As companies redesign their supply chains and assume new roles and responsibilities, performance measurement becomes a critical issue. An objective performance measurement system contributes to the development of good supplier-customer relationships by ensuring that participants operate according to expectations and meeting stated objectives. Generally, companies use a variety of measures (for example, on-time delivery, orders shipped complete, low damage ratio, and so on) to evaluate the performance of both their supply chain partners and themselves. Of the companies that have redesigned their supply chains to effectively integrate with suppliers/customers, 82 percent continually monitor supplier performance measures. These findings are considerably higher than those of earlier studies, strongly suggesting that performance measurement is becoming an established practice.[3]

Supply chain performance is a function of the degree to which participants satisfy mutually beneficial, cross-company objectives. Thus, supplier and customer performance measures should be congruent to avoid potential conflicts. Of the companies that have redesigned their supply chains to effectively integrate with suppliers/customers, 80 percent

EXHIBIT 1

Practices at Companies that have Redesigned Their Supply Chain

report that their performance measures do not conflict with the performance measures of their customers or suppliers. This results in everyone pulling in the same direction and, as a result, is likely to lead to global rather than local (that is, company-specific) improvements in supply chain performance. Although there are no (or few) complete packaged solutions for this activity, it appears that companies are actively engaged in performance measurement and are cognizant of the need to have acceptable measures in place for their suppliers/customers.

The leading companies are taking a team-based approach to company and cross-company initiatives to redesign their supply chains, foster collaboration, and manage ongoing supply chain activities.

Companies that are redesigning their supply chains typically will experience problems. Complacency, corporate policies and politics, and threats to existing power structures are just a few of the roadblocks they can confront. Some problems—lack of management support being prominent among them—may be the root cause of other problems, as research has shown.[4] Of the companies that have redesigned their supply chains to effectively integrate with suppliers/customers, over a quarter (27 percent) experience problems associated with changing established business practices, which is primarily an organizational rather than a technical problem. Thus, the overall success of a company's supply chain redesign will depend on the company's ability to improve existing business processes and alter associated roles and responsibilities accordingly.

VMI Programs

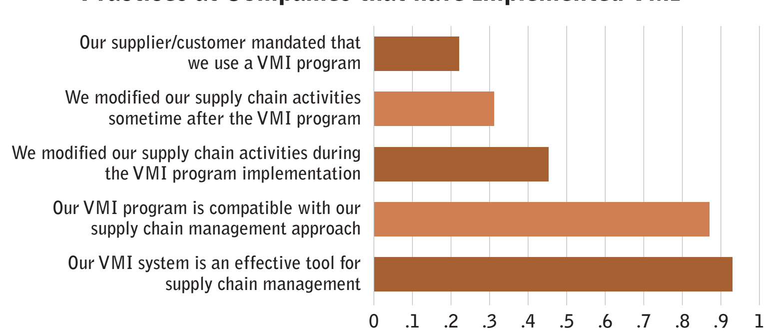
Vendor Managed Inventory is a proven option for integrating supply chains. In a VMI program, suppliers are given pertinent data and information (for example, on-hand balances, forecasts, and shipping schedules) so that they can take responsibility for creating inventory, maintaining it, and generating replenishment orders. In many VMI programs, the suppliers completely control the timing and size of their replenishment orders. Alternatively, some companies choose to maintain control over inventory replenishment, allowing their suppliers to just monitor inventory balances and utilization.

Of the companies that intend to optimize supply chain performance, almost three-quarters have implemented a VMI program. These companies are attempting to link with their suppliers/customers, develop important competencies such as access to inventory data at downstream locations, and derive the associated benefits of reduced inventory costs. A large majority of companies (87 percent) implement VMI programs that are compatible with their supply chain management strategy. This, in turn, suggests that companies have selected VMI programs and information systems that are congruent with their supply chain designs, or redesigns (see Exhibit 2). Of the companies that have implemented a VMI program, 76 percent indicate that they redesigned their supply chain activities either during the implementation (45 percent) or sometime after the VMI program implementation (31 percent).

All things considered, more than nine of ten respondents surveyed acknowledged that VMI is an effective SCM practice. Given the competencies that VMI programs bestow and the associated benefits, we were surprised that over one-fifth (22 percent) of the companies that implemented VMI programs did so because a supplier or customer mandated it. To be sure, some companies like GE, Wal-Mart, and Dell are large enough to mandate supply chain improvements to their suppliers or customers. However, companies should not wait for an invitation (or mandate) — especially if VMI program initiatives are underway in their industries or markets. Not acting can put you at a decided competitive disadvantage.

EXHIBIT 2

Practices at Companies that have Implemented VMI



Yet, some companies may shy away from a VMI program because of concerns over possible impediments that may derail the implementation. Common problems here include inadequacy in a partner's capability, incompatible culture, and lack of trust. Interestingly, 16 percent of the companies say that they are unable to leverage data and information from their VMI information systems because of functional issues within their organization. On that note, companies should integrate business processes and affiliated functions—including inbound logistics, manufacturing, outbound logistics, and sales—before integrating themselves with either upstream or downstream supply chain partners. It's important to remember that an inability to achieve internal integration is almost certain to impede external, cross-company integration with suppliers/customers.

Issues related to trust and supplier-customer relationships, albeit extremely important, seem to be minor issues for our survey respondents; only 10 percent of the companies reporting moderate to major problems related to lack of trust. Overall, our survey findings show that VMI is generally considered to be a proven, beneficial practice. Yet a number of companies falter on the implementation step—or decline to pursue VMI altogether—because of the potential impediments just mentioned above.

IT Investment

Smooth-running supply chains require the seamless flow of information both upstream and downstream. IT, including infrastructure and information systems, is the primary agent for facilitating this. More specifically, it's the enabler for redesigning supply chains, facilitating collaboration both within and across companies, implementing VMI programs, and increasing supply chain visibility either through a VMI information system or other type of supply chain application. To achieve supply chain visibility—including views of capacities, inventories, and shipments at multiple supply chain locations—companies need IT to provide central data repositories, computer networks, and integrated information systems for sharing data and information. Of the companies that intend to optimize supply chain performance, exactly two-thirds invest aggressively in IT to enable supply chain visibility. In these companies, well over three-quarters (89 percent) of senior management support IT investments, such as in VMI information systems. Purchasing and IT management demonstrate equally high levels of support for such investments, at 92 percent and 69 percent, respectively.

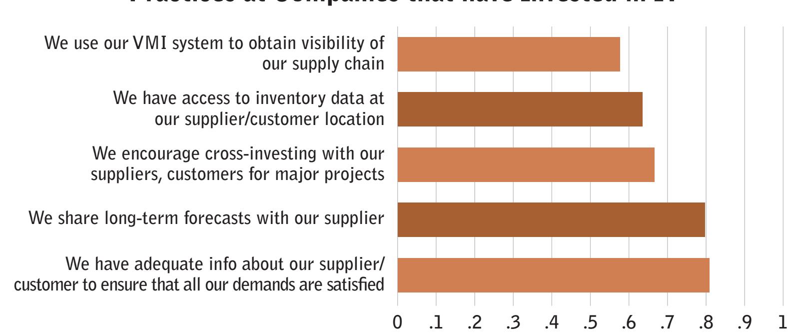
Of the companies that invest aggressively in IT to enable supply chain visibility, 64 percent have access to inventory data at supplier/customer locations, 80 percent share long-term forecasts with suppliers/customers, and 58 percent use their VMI information system to gain visibility into their supply chains (see Exhibit 3). Overall, 81 percent of the companies feel that they have adequate information to ensure that supplier/customer demands are satisfied. These results suggest that IT investments, if successfully implemented, provide companies with valuable supply chain competencies.

As with VMI program implementation, companies may encounter problems with IT deployment. Lack of funds, unreliable IT infrastructure, and incompatible systems are a few of the challenges typically faced.

As with VMI program implementation, companies may encounter problems with IT deployment. Lack of funds, unreliable IT infrastructure, and incompatible systems are a few of the challenges typically faced. Interestingly, almost one-fifth (19 percent) of the companies indicate that they are unable to leverage data and information from their information systems because of technical issues. Over half (54 percent) of the companies cannot integrate VMI information system data with

EXHIBIT 3

Practices at Companies that have Invested in IT



their business systems and 77 percent are unable to integrate their business systems with those of their suppliers/customers. Real-time supply chain integration remains elusive. Even with all of the investment in relevant IT, only little more than half (57 percent) of respondents have achieved this level of integration. Companies still struggling with integration are missing an opportunity to amalgamate important data and to develop more complete pictures of their supply chain performance and processes.

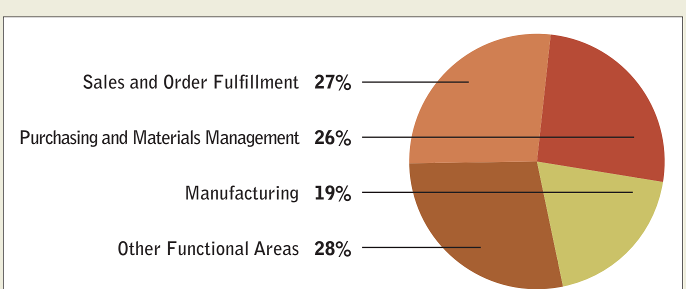
Companies should not necessarily be expected to make the IT investment related to a VMI or supply chain collaboration system alone. In our survey, for example, among those companies investing aggressively in IT to enable supply chain visibility, fully two-thirds encourage cross investing with their suppliers/customers for major projects. Because few companies on their own can afford the IT expense (information system expenditures, consulting, education and training, and so forth), cross investing is a reasonable way to share the cost of the requisite investments with suppliers or customers. To foster cross investing, companies should introduce projects that will produce a positive ROI both for themselves and for their suppliers/customers. In doing so, they can create a financial "win/win" opportunity that will be difficult for their supply chain partners to decline.

Details on the Survey

The survey includes 89 facilities from companies in the upper quartile of Fortune's top-100 list. Over a quarter of the respondents are from sales and order fulfillment, over a quarter are from purchasing and materials management, and almost a fifth are from manufacturing). The remaining respondents come from other functional areas (see accompanying chart). Exactly a third of the respondents are managers, while the remaining two thirds are planners, engineers, and other specialists from sales, order fulfillment, and other areas.

A little over a third (34 percent) of the facilities represented are small to medium size with sales less than $500 million; another 30 percent of the facilities have sales between $500 million and less than $5 billion. Fifty-four percent of the facilities are positioned at the beginning of the supply chain (for example, raw materials suppliers); 34 percent occupy the middle of the supply chain (such as component part and subassembly suppliers); and the remaining 12 percent are positioned at the end of that supply chain (finished goods manufacturers) Sixty percent of the facilities are connected via IT to at least three suppliers/customers, while 11 percent of the facilities are electronically connected to six or more suppliers/customers.

In summary, the sample contains a variety of SCM practitioners from small to large facilities that are mostly at the beginning and middle of their supply chains.



Wanted: A More Sophisticated Practitioner

As we stated at the beginning, analysis of our survey results reveals two distinct groups of companies: sophisticated practitioners of SCM and less sophisticated practitioners. The sophisticated group employs the recommend SCM practices to a greater degree (though, regrettably not yet 100 percent) than do their less sophisticated counterparts. These designations are analogous to supply chain "leaders" and "non-players," as identified by other researchers.[5]

Based on the observed pattern of results, it is possible to characterize each group. Companies in the first group of practitioners make optimization of supply chain performance an important strategy. By pursuing this strategy, they strive to achieve an advantage—possibly a preemptive advantage—over their competitors rather than simply respond to the actions of the competition. Among other key characteristics, the sophisticated practitioners:

- Redesign their supply chains to effectively integrate with their suppliers/customers.
- Redefine supply chain roles and responsibilities to facilitate collaboration, and create cross-company teams to sustain and continuously improve supply chain processes.
- Continually monitor their suppliers' performance with suitable measures that do not conflict with one another.
- Implement an effective VMI program that is congruent with their supply chain management strategy and redesign their supply chain processes either during or shortly after the VMI implementation.
- Finally, sophisticated practitioners deploy IT to increase supply chain visibility. They use information systems to gain access to inventory data at supply chain partners' locations and to share other relevant supply chain information.

Companies in the second group—the less sophisticated practitioners—are not as likely to use supply chain optimization as the driver behind their supply chain improvement efforts. They tend to seek supply chain improvements through means other than a structured optimization approach. Further, they are less likely than the sophisticated practitioners to redesign their supply chains; redefine supply chain roles and responsibilities; and use cross-company teams for managing supply chain processes. Less sophisticated practitioners sometimes even use performance measures that conflict with those of their suppliers and customers. They also are less likely to have implemented VMI programs. And even if such programs are in place, this group is less likely to have redesigned supply chain activities to accommodate those programs. Moreover, a certain percentage of the less sophisticated companies may have instituted a VMI program only because a customer or supplier mandated it.

Finally, less sophisticated practitioners are not as likely to invest in IT to improve supply chain visibility and share important supply chain information. As a result, they are less likely to feel that they have adequate information to satisfy their suppliers/customers.

As companies move forward with supply chain redesign, VMI, and IT investments, they can expect to encounter problems related to technical and functional issues. This almost always is the case, especially if the changes are considerable in scale and scope. Unlike less sophisticated practitioners, sophisticated companies take certain steps to avoid potential problems and to develop plans for addressing any difficulties that do arise. Reflective of this, sophisticated practitioners are more likely than their less sophisticated counterparts to implement VMI programs that are congruent with their supply chain approach and/or redesign their supply chain activities to accommodate a VMI program.

In conclusion, our survey found that even in the biggest corporations, recommended SCM practices are not universally applied; in many cases, in fact, the uptake is much less than 100 percent. To advance along the supply chain "sophistication" spectrum, practitioners should consider one or more of the following actions:

- Commit to supply chain optimization as a driving supply chain strategy.
- To improve integration, redesign all or parts of the supply chain and facilitate collaboration among supply chain partners via clearly defined roles and responsibilities.
- Implement multiple, non-conflicting performance measures for suppliers and customers.

IT is the enabler for redesigning supply chains, facilitating collaboration both within and across companies, implementing VMI programs, and increasing supply chain visibility.

- If not already in place, implement a Vendor Managed Inventory program—nine out of ten companies find VMI programs to be effective for supply chain management.
- Invest in IT to increase supply chain visibility and facilitate information sharing.
- During supply chain redesign, VMI program implementation, and IT deployment, recognize that problems will emerge and develop plans to avoid or mitigate them.

By implementing these actions and incorporating insights gleaned from the survey's findings, supply chain practitioners may be able to advance their supply chains toward best practice.

End notes

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STRATEGIC SOURCING: From Local to Enterprise-wide Services Procurement

By Jim McIntosh and Margot Levin

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Many large companies still procure services at the local level, believing that this spend category is best managed and measured there. Yet this approach forecloses on some important opportunities. Organizations that have successfully moved from a local to an enterprise-wide approach to services procurement report savings of 15 to 20 percent—plus key operational improvements. The Strategic Sourcing approach described here can help guide that transition.

Just as the role of services in the national economy has expanded significantly in recent years (from 67 percent of total private-sector output in 1980 to 80 percent in 2006[1]), the percentage of companies' total spending on services has increased dramatically. The 1990s saw a significant increase in services outsourcing—first of IT services and over time extended to other "non-core" services, such as logistics, human resources, accounting, and recruiting. In addition, companies increasingly are turning to outside providers for certain specialized services when they need a particular type of expertise.

Services pose a unique procurement challenge: they are harder to define explicitly and quality is best assessed by the end-user. For these reasons, many organizations tend to procure services locally, rather than by following an enterprise-wide strategy. Yet a local procurement strategy, while it may appear easier to pursue, may not yield optimal results for the organization. Customers may become tied to a particular incumbent supplier and may even specify requirements that only that incumbent can meet. Restoring objectivity to the procurement process is one benefit of developing an enterprise-wide approach.

In addition, a more detailed analysis of spending patterns in this area typically reveals a significant savings opportunity. In today's economic climate, companies are challenged to find more cost-effective ways of doing business. Our experience

across numerous industries and organizations suggests an improvement opportunity of up to 15-20 percent reduction in spending on a given services spending category from an enterprise-wide approach. Unlike other changes in business practices, reductions in spending have a direct impact on the bottom line—and may make the difference in determining whether or not a company can survive.

This article will provide an overview of the key processes used to successfully move an organization from a local to an enterprise-wide services procurement strategy. It includes several examples and case studies to put context around the effort. Finally, we offer a number of "steps to success" to get the enterprise-service procurement initiative moving along the right path.

Procurement Team Leads the Way

Moving from a local to an enterprise-wide procurement strategy represents a sea change for many organizations. The best way to meet this change-management challenge begins with creation of a procurement team to lead the transition. Importantly, team members should include representatives from all key functional stakeholder and end-user groups, with an emphasis on wide geographic participation in organizations with a national or global presence.

The exact make-up of the procurement team will depend on the organization's overall structure. Using the procurement of temporary staffing services as an example, key functional stakeholders and end-user groups may include human resources managers from all major geographic areas as well as representatives of groups that frequently use temporary personnel (for example, the marketing department or customer service). Consultants with expertise in general sourcing or in the specific spending category may also participate.

In a company with a well-defined procurement function, the procurement officer/manager responsible for HR-related categories may lead the team. For companies without such a position, appropriate team leadership will depend on the underlying organizational structure and should be determined in a way that best positions the initiative for success. The procurement team in this example has the explicit mission of reducing the total cost of procuring temporary staffing services while ensuring quality and efficient service delivery.

Local procurement managers may have their own individual ideas about best practices for certain spending categories. Team leaders should encourage their input while allowing best practices from all areas to be shared and documented across the organization. These are the valuable "lessons learned."

The procurement team should endeavor to cultivate project champions among the key stakeholders at all levels of the organization; these champions will provide the support base necessary for any successful change management effort. It is equally important to identify project challengers—those individuals who are not supportive—early in the process. Early and ongoing engagement with challengers may help to convert them to champions, or at a minimum, may mitigate the negative impact of any actions they might take to derail the process.

Not all key stakeholders will need to be actively involved throughout the procurement team's work. Projects to develop a new procurement strategy often are sponsored by the office of the CFO, where bottom-line results are especially valued. Or in some instances, the sponsor may be the CPO (Chief Procurement Officer). With some of these more senior stakeholders, creating awareness of the project and updating its status over time is sufficient. Stakeholders that are a part of the procurement team, such as the human resources manager from a particular region in the example above, will have more active involvement. They should understand that their contribution is critical to the project's success. Accordingly, procurement team leadership needs to respect their participation by incorporating their feedback into the project deliverables. The success of an enterprise-wide program will depend on the effective engagement of individuals who believe in the program's value throughout the organization.

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Five-step Strategic Sourcing Approach

Once established, the procurement team will be responsible for assessing the current standards and costs of the spending category being evaluated, reviewing supply chain and procurement practices, and making recommendations to move the organization towards "best-in-class" management of the category. When moving from a local to an enterprise-wide procurement strategy, it is particularly important that the team's work is data-driven and fact-based.

The Strategic Sourcing process offers a proven and effective way for guiding this transition. Originally applied to the procurement of goods, the traditional Strategic Sourcing process (see Exhibit 1) is equally effective for services procurement. The five-step process described below provides a systematic framework for analyzing both internal and market data and for developing recommendations for improvement.

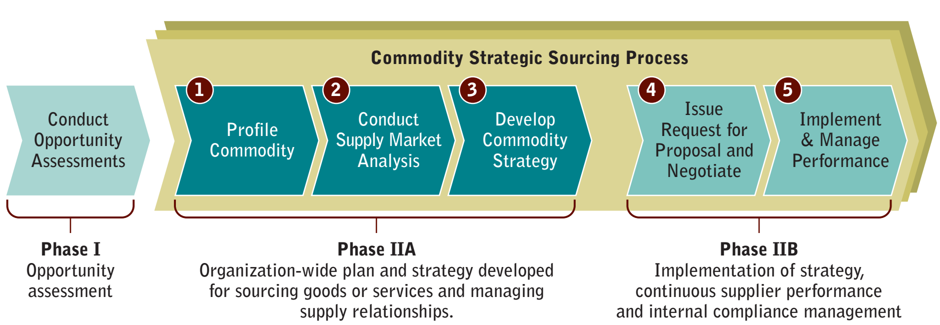
A typical Strategic Sourcing project begins with an opportunity assessment. In addition to identifying and analyzing the relevant databases, this assessment involves prioritizing categories for Strategic Sourcing based on:

- Total spending
- Appropriateness for sourcing
- Assessment of potential savings
- Ease of sourcing implementation

Note that "appropriateness for sourcing" may involve the assessment of a number of factors, including how recently the spending category has been

EXHIBIT 1

Five-Step Strategic Sourcing Process



sourced and whether or not an enterprise-wide strategy has been evaluated or attempted. If a spending category, whether a good or a service, has not been sourced recently and is largely purchased at the local level, the Strategic Sourcing opportunity for improvement may be great. The reason: leveraging national demand is a highly effective savings tactic.

Step 1: Creating the Commodity Profile

The first step of the Strategic Sourcing process, developing the commodity profile, involves analyzing databases and contracts and conducting interviews. The objective here is to develop a comprehensive understanding of the commodity, or spending category. Unlike physical products, services are intangible and may be more difficult to define objectively, so the engagement of key stakeholders is critical. Depending on the size of the procurement team, it may be appropriate for a subset of the team to conduct the initial data analysis and interviews, and present their findings to the rest of the team for their input. To continue the temporary staffing example, the HR procurement officer may be responsible for the necessary contract analysis and interviews, perhaps with the assistance of a consultant. This individual would then present the results to the regional HR managers for further input and refinement.

When evaluating spending on services, it's especially important to properly categorize the spend data. The spending analysis is a crucial step in the development of the sourcing strategy. Not properly categorizing the spending may result in an ineffective communication with the marketplace, or even the use of a suboptimal vendor pool.

Especially when moving from a local to an enterprise-wide procurement strategy, it's important to develop a set of category and sub-category definitions that all stakeholders understand and support. Administrative services provides an excellent example of the importance of developing an accurate and specific spending categorization. Some companies define "administrative services" very broadly, including services as varied as clerical services, mail and courier services, and language support services (see Exhibit 2). While this taxonomy may make sense for a particular purchasing organization, it does not reflect the way that the industry is organized; language support services is a specialized type of work that many administrative services providers may not support. By seeking out only service providers that can provide language support services, a company may artificially limit its vendor options.

The taxonomy ultimately developed by the procurement team should be one that the industry recognizes; in the case of administrative services, a more effective taxonomy for procurement purposes would exclude language support services. Early and continued participation of SMEs and other key stakeholders in the data analysis should allow the procurement team to develop an accurate and useful set of category and sub-category definitions.

Step 2: Conducting the Supply Market Analysis

Understanding how your company defines a given service area is important in developing an accurate commodity spending profile; but it's just as important to understand how the marketplace defines the service area. A good market analysis is based on data analysis and interviews with key service providers and customers—and sometimes even meetings with industry leaders or industry associations. The analysis generally includes an overview of the competitive landscape, the size of the market, typical industry cost structures, current and upcoming trends, and industry best practices. The procurement team uses this information to develop the best strategy for approaching the marketplace.

Another aspect of the market analysis that may be especially relevant for services focuses on the typical size of companies providing the service. Some specialized services, such as environmental services, are provided

EXHIBIT 2

Sample Taxonomy: Administrative Services

largely by small businesses whose services are typically procured locally. If an organization has a goal of encouraging small business participation in procurements, as is often the case in the public sector, the procurement team may need to develop criteria for determining whether a given small business is qualified to provide the required services on an enterprise-wide basis. These criteria typically include an evaluation of the company's past performance on similar projects (generally involving interviews with references); an examination of the company's plan to extend its geographic reach (often through strategic partnerships); and an assessment of the company's familiarity and experience with similar acquisition strategies (context-specific expertise). Similar criteria are used to evaluate large businesses as well. SMEs and other stakeholders should be involved in developing these evaluation criteria and assessing the information received in response to the solicitation of capability information.

An understanding of the industry's cost structure gives the procurement team insight into how requests for pricing proposals should be designed and the responses evaluated. This understanding may also provide insight into how costs vary by location, which is an important part of the analysis when moving from a local to an enterprise-wide strategy. Although labor is the most significant cost component for many services, it is not sufficient to compare labor rates alone. Rather, you need to break down labor rates into wages and markup—typically sales, general, and administrative (SG&A) plus profit.

Temporary staffing provides an instructive example of why companies need to closely examine the cost structure. Temporary staffing pricing is typically negotiated based on hourly labor rates for specific labor categories by location. To illustrate, the table below contains data from two suppliers (Supplier A and Supplier B) bidding on a specific labor category at a given site.

Sample Cost Structure—Temporary Staffing

	Supplier A	Supplier B
Wage Rate	$9.50	$8.50
Markup	$3.00 (24% of Labor Rate	$4.00 (32% of Labor Rate
Total Hourly Labor Rate	$12.50	$12.50

While the total hourly labor rates proposed by the two suppliers are the same, the underlying wage rates and markups reveal a more complete picture. Wage rates are determined by the labor market, so the $1 difference in the wage rates at first glance suggests that Supplier A is providing a more highly skilled worker. But when comparing such proposals, the procurement team needs to dig deeper to understand what's behind the wage differential. It may be due, for example, to a misunderstanding of the requirements or a less-skilled worker being provided to meet the requirements.

The difference in markups between the two suppliers is also significant. While the lower markup may initially suggest that Supplier A is more efficient than Supplier B, it could also mean that Supplier B is investing more in training its personnel. The procurement team evaluating the cost structure must delve into such issues. The team must be prepared to solicit pricing proposals in a sufficient level of detail to enable a full investigation of the resulting pricing information.

Step 3: Developing the Commodity Sourcing Strategy

Development of the commodity strategy, the third step in the Strategic Sourcing process, entails synthesis of the commodity profile and the market analysis. This exercise establishes the foundation for the commodity sourcing roadmap. The roadmap describes the way forward, moving from high-level strategy to more specific tactics. In developing the commodity strategy, the procurement team identifies the primary sourcing objectives and the most appropriate sourcing tactics to achieve these objectives. Sample objectives in an enterprise-wide services procurement strategy may include:

- Simplification of the acquisition process
- Standardization of requirements
- Improved demand management
- Leveraged volume to achieve competitive costs
- Increased competition among vendors/contractors

Appropriate tactics to meet these objectives may include standardization of specifications and contracts, vendor/contractor rationalization, competitive bidding, and implementation of quality assurance processes.

In documenting the commodity strategy, the procurement team also should include business cases estimating the potential benefits and savings associated with each of the identified recommendations.

Again, it is important for SMEs and key stakeholders to participate in the development of the sourcing strategy, either as active participants in the necessary brainstorming or, at a minimum, as interim reviewers who provide feedback on the strategy and business cases as they evolve.

often the optimal approach because it leverages the suppliers' expertise to meet the stakeholders' objectives.

We can turn again to temporary staffing to illustrate the workings of a PWS. If a customer needs a temp to replace a receptionist who has called in sick, the desired outcome is having a qualified individual on site that day by a specified time. A metric that may be used to track performance is the time within which the qualified person is available on-site after the initial request is made.

The PWS for each type of project to be included in the RFP will ultimately become part of any contract that is awarded at the conclusion of the solicitation process. For this reason, it's highly beneficial to engage potential service providers in the development of the performance evaluation criteria. With well-defined evaluation criteria, the PWS provides a basis both for comparing prospective providers' responses to a solicitation and for evaluating providers' ongoing performance after the contract is awarded.

Once suppliers have responded to the RFP, it is important to evaluate their proposals objectively. The best way to do that is through a comprehensive scorecard with explicit criteria and guidance on how proposals should be evaluated. In developing the scorecard, the procurement team must balance the sometimes conflicting ideas of key stakeholders. When moving from local to enterprise-wide services procurement, the team should start by emphasizing areas on which the parties agree. The evaluation process should also place greatest weight on those factors most important to the organization's specific business needs. The best practices researched as part of the market analysis should provide valuable input to the procurement team as it evaluates the suppliers' proposed approaches.

Exhibit 3 gives an example of the type of formal

Step 4: Issuing a Request for Proposal

Typically, a strategic sourcing strategy includes the development of a request for proposal (RFP) to be released to the marketplace. When moving from local to enterprise-wide procurement, you need to engage industry early in the RFP development process. The solicitation of capability information is often the first step in this engagement process. As the procurement team refines its requirements and other aspects of the RFP, it may be useful to solicit feedback from key industry players as well as from the stakeholders and SMEs already represented in the process.

The transition from local to enterprise-wide procurement may entail the use of performance-based acquisition tools. Local purchasers of goods and services typically argue that only they are qualified to evaluate the performance of vendors and service providers. It is certainly true that the quality of services provided is best evaluated by the end user. To that end, procurement teams developing enterprise-wide strategies can make good use of tools that allow for objective performance measurement. These tools should be designed to capture and compile the best local knowledge in a way that allows personnel throughout the organization to effectively use the tools.

Performance-based work statements (PWS) are one such tool. These are a specialized type of statement of work (SOW) that is typically used when the purchaser's primary concern is "what" work is to be performed (i.e., outcomes), not necessarily "how" it is to be performed. An effective PWS includes specific metrics associated with each outcome and:

- Reflects the goals and objectives of the acquisition as determined by the procurement team and key stakeholders.
- Contains an appropriate level of detail and specifications.
- Is clear and unambiguous.
- Contains measurable performance evaluation criteria.

Leaving the technical details of how the work should be done to the prospective suppliers is

EXHIBIT 3

Sample Proposal Evaluation Scorecard (Temporary Staffing Services)

	Vendor A	Vendor B	Vendor C	Vendor D	Vendor E	Vendor F	Vendor G
Non-Pricing Evaluation Criteria							
Geographic Coverage							
Ordering and Billing Capabilities							
Management Reporting							
Implementation Plan							
Quality Control Program							
Employment Practices (e.g. Recruiting, Takeover)							
Training Capabilities							
Security Procedures (e.g. Background Checks)							
Customer References							
Pricing Evaluation							
Sample Scenario 1							
Sample Scenario 2							
Sample Scenario 3							

scorecard, including pricing evaluations, that the procurement team could use to evaluate RFP responses on temporary staffing services. Exhibit 4 shows a simplified set of non-pricing evaluation scoring guidelines that could be used effectively. When executing this step, it is important for the procurement team to do the following: develop its own list of appropriate evaluation criteria; establish the rela-

Environmental Services Sourcing: A Case Study

Environmental services is often considered to be ill suited for an enterprise-wide procurement and management approach. The reason given: it's too specialized and difficult to measure. Yet the following real-life example from a large client illustrates the opportunity for applying an enterprise-wide approach to such a complex service.

This category of spending covers engineering and analytical services performed to ensure that government locations and businesses comply with all federal and local environmental protection regulations and laws, such as those concerning clean air, clean water, emissions reduction, the protection of sites such as Indian burial grounds, the protection of certain animal habitats, and so forth. Many organizations do not have experts in house to perform this function, and choose to contract with environmental services providers.

The environmental services industry in the United States is highly fragmented and competitive, encompassing several thousand companies with collective revenues in excess of $125 billion. Environmental services companies range in size from one-person operations to large corporations that are often diversified into engineering and construction services. Labor (including wages, contractors, and subcontractors) is the major cost component of these services.

The Client Situation

The client is a national organization with locations throughout the United States. Typically, environmental services managers at each location purchased environmental services locally. While meeting the needs of each individual site, this approach often led to different prices being paid for essentially the same services and impeded enterprise-wide management. Local purchasers also often relied on the same set of trusted incumbents time after time, rather than engaging a broader potential vendor pool. The key challenge for the team was determining how to leverage the organization's buying power nationally while continuing to ensure quality deliverables at the local level.

Through extensive analysis, the team developed a comprehensive commodity profile, including both a quantitative analysis of spending patterns and a qualitative description of customer needs, as well as a thorough market analysis. Subject matter experts (SMEs) and other key stakeholders participated in the analysis and development of recommendations. Common outcomes were identified with enough flexibility to account for unique local requirements. The client also had a socio-economic goal of ensuring that small businesses providing environmental services at the local level would not be excluded from the new procurement process. For implementation, the team elected to pursue national contracts for each of the main types of environmental services, with provisions put in place to encourage small business participation.

Typically, individual client sites used statements of work that specified how the work would be performed and by what type of personnel—that is, the specific qualifications required. While most locations would agree on the outcomes required, there could be differences in the statements of work that contributed to the different prices paid by various locations. In transitioning to a new procurement strategy, one of the main concerns of the SMEs and stakeholders was how to ensure quality deliverables and outcomes once the transition had been made from local to national procurement. Therefore, a key element of the procurement process would be the development of a library of performance-based work statements that would ultimately be incorporated into national contracts. Under the plan, the quality of deliverables and outcomes would be monitored at the local level.

In order to reach the broadest competitive pool of vendors for the national requirements, the implementation team encouraged small businesses to pool together to increase their geographic coverage capabilities. Throughout the development of the procurement process, the company strived to provide as much information as possible to the vendor pool to encourage participation by all qualified service providers.

As part of the performance-based procurement process, quality assessment tools and metrics have been established for each of the main categories of work to be provided. Results are assessed at the conclusion of each project, with vendor payment contingent on successful outcomes.

15 Percent Savings and More

The first projects procured under the national contract approach yielded savings of approximately 15 percent. Going forward, the client expects that enterprise-wide procurement of environmental services through national contracts will facilitate analysis and comparisons of costs across locations and will improve spending management.

EXHIBIT 4

Sample Non-Pricing Evaluation Scoring Guidelines

Non-Pricing Evaluation Scorecard Guidelines	
1	Does not meet any expectations
2	Does not meet any expectations on more than half of criterion elements
3	Meets, but does not exceed, all expectations
4	Exceeds expectations on more than half of criterion elements
5	Exceeds all expectations; Best in Class

tive importance of the criteria; set the expectations that vendors must meet; and establish guidelines for evaluating proposals.

Step 5: Managing Performance—The Key to Sustainability

The key to sustaining an enterprise-wide approach is ensuring that local purchasers are satisfied with the process and do not experience a degradation in service quality. The best way to accomplish this goal is to develop a quality assessment process as part of the performance-based acquisition. As in all the previous steps in the Strategic Sourcing process, key stakeholders and SMEs should be involved in developing the necessary quality metrics. Industry input should be incorporated as well. Such input may be especially useful in assessing the economic and cost trade-offs that may be associated with rigorous performance requirements.

In some situations, it may be necessary to engage qualified third parties in the quality evaluation process. For example, one client that adopted an enterprise-wide approach to sourcing roofing services also contracted with a third-party roofing inspector to assure that the work met the required quality standards. Note that when selecting a third party, you also need to consider any potential conflicts of interest that may arise.

Moving Forward: A Call to Action

Developing an enterprise-wide services procurement strategy will enable organizations to benefit from leveraging their purchasing volume in the marketplace. In addition to a potential 15-20 percent reduction in spending on a given services spending category, an enterprise-wide approach to a previously locally procured service can bring other important benefits. These include a more streamlined acquisition processes, greater standardization of requirements, more consistent service quality, and an improved ability to manage spending across the organization.

To implement an enterprise-wide strategy successfully, businesses must follow several specific best practices. To recap the key points made in this article, we recommend the following "steps to success":

- Gather accurate spending data.
- Engage key stakeholders and subject matter experts (SMEs) from across the organization.
- Clearly define the spending categories and types of services to be acquired.
- Conduct a thorough market analysis, including an understanding of basic market forces and cost structures and an assessment of the availability and quality of nationwide suppliers.
- Encourage communication with industry to ensure that its expertise and current best practices are incorporated into the procurement process.
- Develop procurement tools, including Performance Work Statements, objective supplier scorecards, and quality assessment metrics.

By following the steps described here, procurement teams can successfully lay the groundwork to move from a local to an enterprise-wide strategy, even with the most complex services. Broadening the vendor pool and introducing greater competition into the procurement process—in effect, casting a wider net—will allow organizations to achieve significant savings and performance improvements.

Benefits include a more streamlined acquisition processes, greater standardization of requirements, more consistent service quality, and an improved ability to manage spending across the organization.

Footnotes:

1 "Outline of the U.S. Economy 2009 Edition", U.S. Department of State Bureau of International Information Programs, page 46.

Getting a Handle on Complexity

Effectively managing complexity in the supply chain is one of the most important actions that companies can take to add real value to their business.

By Kristen Etheredge and James O'Keefe

In the pursuit of revenue growth all too many companies have embraced the adage "everything to everyone." For many companies, the end result is overwhelming complexity. This complexity impacts all aspects of the firm's value chain: the sales force is burdened; marketing's messages are diluted; production struggles with capacity constraints and high changeover rates; and supply chain is shackled by reduced economies of scale and buyer power, increased (and often slow-moving) inventories, and encumbered logistics. The supply chain team is in a strong position, within most companies, to drive the complexity reduction discussion and to serve as stewards of complexity management in the long term.

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Meaningful, sustainable benefits require a strategic complexity-management program with input across the value chain. Our recent experiences assisting clients with strategic complexity management have shown that applying the following four-step approach increases the likelihood of meaningful, sustainable supply chain benefits:

- Drive complexity management from the C-level suite.
- Create SKU cost and complexity transparency.
- Engage stakeholders across the entire value chain.
- Install processes and governance to ensure sustainability.

Step 1. Drive Complexity Management from C-level Suite

All complexity is not bad. Value-adding complexity offers firms a way to meet customer demands and create a real competitive advantage. Top management must be able to effectively communicate the value proposition their firm offers and the appropriate level of value-add complexity required to deliver this proposition to the market. Elimination of value-destroying complexity is often an uncomfortable process that will falter without the unwavering support of the C-level suite. To be successful, sustainable complexity management requires hard work, considerable patience, and top management's continuous attention.

In a recent client situation, the CEO sponsored the complexity-reduction initiative, ranking it in his top four initiatives for the year. Throughout the course of the program, he set the tone for the rest of the organization, which helped remove barriers (both perceived and real), and empowered the organization to move swiftly and decisively.

Step 2. Create SKU Cost and Complexity Transparency

Analysis by A.T. Kearney has shown that many companies fail to fully understand the relationship between complexity and costs within their product portfolios. A.T. Kearney has developed a "multi-cube" data model that systematically organizes the level of complexity and associated cost at the SKU level, thereby making previously complex data easy to comprehend. The multi-cube model enables this comprehension by assessing revenue, cost and profitability for each SKU sold over a select time period, coupled with estimated raw material pricing and SKU-level manufacturing costs. A crucial element in this analysis is shifting from a traditional approach to allocating fixed costs to an activity/complexity-driven allocation.

Another tool that has proved useful is the development of Complexity Trees. Complexity Trees look a lot like a traditional family tree. A tree starts at the top with a common grouping (usually a product/family brand or packaging type) and then branches out based on increasingly specific product/packaging attributes until you reach each unique SKU. For each SKU, it is helpful to include a table of key metrics, such as total volume, gross margin, and inventory turns. By evaluating the complexity at the branch or group level——not the individual SKU level—the team can move beyond simply "cutting the tail" to truly pruning the tree for better value growth and improved supply chain performance.

In most client engagements of this nature, Complexity Trees serve as the backbone of a multi-day idea-generating "summit," with broad cross-functional participation. The goal: to drive complexity out of the value chain.

Step 3. Engage Stakeholders across the Entire Value Chain

For maximum, sustainable benefits, it's critical to engage stakeholders across the entire value chain in the development of ideas to reduce complexity and create efficiency. Bringing sales, marketing, R&D, production, and supply chain into one room to discuss a sensitive topic such as complexity management can be uncomfortable. But it is only through such cross-pollination of ideas that a firm can move beyond merely scratching the surface and instead extract meaningful and sustainable benefits.

In our experience, an "ideation summit" process has proven especially effective here.

In such a process the team systematically and critically questions all elements of the value chain in a focused workshop session. The objective is to develop an idealized state of the company's product offering and value chain.

Next, a bottom-up approach is taken. Specifically, teams comprised of stakeholders across various elements of the value chain analyze SKUs to determine their profitability/strategic values vs. their associated complexity. Complexity trees provide a tangible focal point for conversation among the team members. It is our experience that the teams will quickly move beyond simply eliminating the SKU tail and will start identifying levers that will help the organization manage its complexity.

In addition to eliminating the SKU tail, the "ideation summit" at one client identified nearly 200 potential opportunities, the vast majority of which were supply-chain focused. These initial ideas were vetted and evaluated, creating a focused list of priority items that will deliver $35-40 million in value for one region across four areas: top line growth, packaging, raw materials, manufacturing, and logistics.

To deliver long-term, sustainable results, a strategic approach touching multiple aspects of the value chain is required.

Step 4. Install the Right Processes and Governance to Ensure Sustainability

As the trumpets fade and the initiatives selected during the ideation sessions are put into action, management needs to put in place a process and governance to manage complexity in the long run. One suggestion is to incorporate ongoing multi-cube analysis to ensure that the entire value chain is continually surveyed to control complexity. While this is a useful surveillance mechanism, in order to maximize sustainable benefits, a firm should address those processes that create complexity in the first place--such as product portfolio management, R&D processes, and the product lifecycle management process. Moreover, just as senior executives were critical in initiating the complexity management initiative, their continued vigilance is essential to ensuring sustainable benefits.

In a recent engagement, we embedded the multi-cube tool into a client's IT and decision support tool set. The multi-cube was created in such a manner that it could be easily "refreshed." In addition, training was provided to ensure that the supply chain users could leverage the tool independently to enable sustainable results.

Challenging Process, Profound Gains

Harvesting the low-hanging fruit, in and of itself, will not yield meaningful change. To deliver long-term, sustainable results, a strategic approach touching multiple aspects of the value chain is required. Achieving such results will likely significantly impact a firm's supply chain in the form of the production lines closures, the elimination of product lines, the standardization of packaging and formulation, alteration of processes, and adoption of best practices. The complexity-management approach we have outlined here provides a means for the supply chain organization to mobilize the firm to address complexity and to ensure that the benefits of complexity reduction are indeed sustained.

TRUCKING: A SPECIAL REPORT

TRUCKING'S *GAME-CHANGING* MOMENT

John D. Schulz, Contributing Editor

Many trucking executives believe that we're on the cusp of a steady, prolonged recovery with solid price increases to match. Analysts aren't so sure. But nearly all agree that shippers should expect rate increases when their contracts expire, some in the 3-percent to 5-percent range. Here are the four issues that are now in the driver's seat.

Trucking is coming out of its worst three-year slump since the 1930s. Housing and automotive, two hugely important sectors to trucking, both cratered simultaneously starting in early 2007 and have not fully recovered yet.

It's gotten so bad that veteran trucking analyst John G. Larkin of Stifel Nicolaus, worried about continuing overcapacity in the industry, continues to "de-emphasize" trucking stocks to his clients in favor of railroads. Except for recommending a couple of small-cap trucking stocks and perhaps a non-union carrier or two, Larkin really is not recommending any general trucking companies these days.

Less-than-truckload (LTL) companies have been particularly hard hit, according to analysis compiled exclusively for *Logistics Management* (*LM*) by Satish Jindel of Pittsburgh-based SJ Consulting. He says that the average operating margins of LTL carriers fell by 5.5 percent last year, with Old Dominion Freight Line being the only LTL carrier to report positive operating margins during every quarter in 2009. Con-way Freight was the only other reporting carrier to have positive operating margin for the entire year, a scant 1.9 percent.


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All reporting LTL carriers posted year-over-year declines in shipments, with YRC National suffering the worst decline at 36.3 percent. Con-way was the best, ringing in a 0.3 percent decline in shipments.

Just how bad is it out there for the nation's top LTLs? Let's ask some survivors.

Myron P. "Mike" Shevell, chairman of the Shevell Group, the parent of New England Motor Freight (No. 17 on *LM*'s Top 25 LTL list), says conditions today in the industry are the worst he's seen in his 60 years in the industry. "Brutal," Shevell says simply. "Everybody is just trying to hang on."

Top 25 less-than-truckload carriers 2009 revenues (including fuel surcharges)

RANK	CARRIER NAME	2009 REVENUE ($ million)
1	FedEx Freight	$3,618
2	YRC National	$3,177
3	Con-way Freight	$2,574
4	UPS Freight	$1,807
5	ABF Freight System	$1,260
6	YRC Regional	$1,226
7	Estes Express Lines	$1,174
8	Old Dominion Freight Line	$1,158
9	R+L Carriers*	$862
10	Saia Motor Freight Line	$794
11	Southeastern Freight Lines*	$628
12	Vitran Express	$519
13	Averitt Express	$471
14	AAA Cooper Transportation*	$418
15	Central Transport International*	$342
16	Roadrunner Transportation	$316
17	New England Motor Freight	$311
18	Pitt-Ohio Express	$255
19	Dayton Freight Lines*	$214
20	A. Duie Pyle*	$205
21	New Century Transportation*	$186
22	Central Freight Lines	$162
23	Daylight Transport	$128
24	Wilson Trucking*	$122
25	Oak Harbor Freight Lines*	$104
2009 TOP 25 TOTAL REVENUES		$22,031

Note: Revenues for LTL operations only, unless otherwise indicated
*Revenues include truckload and other services
Source: Company reports and SJ Consulting Group estimates

Others agree. Ray Slagle, senior vice president of sales and marketing for ABF Freight System (No. 5 on *LM*'s Top 25 LTL list) says :"The past couple years are the worst that I've seen in my 37 years in the business. While we have seen some incremental improvements, there has not been a material change." In fact, Stifel Nicolaus is not forecasting a profit for this venerable Teamster long-haul carrier until 2011.

"It is still a game of survival in many respects," says Chuck Hammel, president of Pitt Ohio Express (No. 18 on *LM*'s Top 25 LTL list). "But there are also opportunities for those brave enough to move forward."

Pitt Ohio, for example, has branched out from its regional LTL roots to offer longer-haul and specialized logistics services. Old Dominion Freight Line, another old-line regional carrier, now is offering everything from long-haul truckload to other specialized services for shippers.

David Congdon, CEO of ODFL (No. 8 on *LM*'s Top 25 LTL list), says he believes the economy has bottomed out. "We have seen some hints of an improving economy, albeit from a low bottom," he says. "It's nothing to jump up and down and scream about. But we are seeing a little bit of strength."

On the truckload (TL) side, the story was slightly better. That's because the non-union TL carriers were able to react to the sudden drop in freight volumes somewhat quicker than the LTL sector, which has higher fixed costs in general because of the extensive hub-and-spoke terminal networks they operate.

For TL, according to Jindel's analysis, average operating margins fell 0.4 percent last year from 2008 levels, while average operating margin was 3.4 percent last year compared with 3.8 percent in 2008. Among the best were Heartland Express, Knight Transportation, Celadon, and Con-way Truckload, all reporting positive operating margins last year.

Still, total TL loads fell 3.3 percent last year from 2008. J.B. Hunt and P.A.M Transport showed the largest declines, falling by 20 and 15 percent respectfully. That was part of a conscious decision by both carriers to diversify—especially Hunt where pure truckload revenue now accounts for just over one-third of total revenue. The reporting TL carriers moved a combined 200,000 fewer loads last year than in 2008, Jindel says. In fact, at the depth of the downturn last year, many TL carriers were faced with freight volumes falling as much as much as 25 percent in some lanes.

TL carriers have responded by parking trucks at an unprecedented rate during the depth of the recent recession. As Steve Williams, chairman and CEO of Maverick Trucking, a large Little Rock, Ark.-based TL carrier, recently told the *Arkansas Trucking Report*: "It took us 30 years to get up to 1,500 trucks. It took us three months to park 300 of them."

So, was this trucking's worst recession ever? "The others weren't anything compared to this," Williams told *ATR*. "This is the 'Big Kahuna.' It's a game-changing moment."

Those days, thankfully, appear to be over. The current forecast

is for TL volumes to rise modestly after hitting the floor the first half of 2009. But analyst Larkin says TL volumes "are still not robust" and that there is no clear consensus on how strong the recovery will be.

In interviews with *LM*, some trucking executives believe that we're at the cusp of a steady, prolonged recovery with solid price increases to match. Others aren't so sure. But nearly all agree that shippers should expect rate increases when their contracts expire, some in the 3-percent to 5-percent range.

So what are the industry leaders in trucking doing to hasten their recovery? *LM* spoke with more than a dozen top trucking executives and have broken down their analysis into four broad market issues that could directly affect shippers during the remainder of 2010.

Top 25 truckload carriers 2009 revenues (including fuel surcharges)

RANK	COMPANY NAME	2009 REVENUE ($ Million)
1	Swift Transportation	$2,489
2	Schneider National	$2,380
3	Werner Enterprises	$1,433
4	U.S. Xpress Enterprises	$1,333
5	J.B. Hunt Transport Services	$1,204
6	Prime Inc.	$992
7	C.R. England	$866
8	Crete Carrier Corp.	$849
9	CRST International	$610
10	Knight Transportation	$585
11	Ruan Transportation Management Services	$584
12	Covenant Transport Group	$541
13	Celadon Group*	$479
14	Ryder Systems	$471
15	Heartland Express	$460
16	Western Express	$457
17	Interstate Distributor Co.	$448
18	Stevens Transport	$439
19	Anderson Trucking Service	$432
20	Comcar Industries	$400
21	Marten Transport	$397
22	National Freight	$385
23	Dart Transit	$373
24	USA Truck	$368
25	Con-way Truckload	$365
TOTAL TOP 25 TRUCKLOAD CARRIER REVENUES		$19,340

Note: Revenues are for truckload operations and exclude intermodal, logistics and other services
*Revenue adjusted to reflect calendar quarters
Source: Company reports and SJ Consulting Group estimates

Issue #1: Overcapacity

This recession had survivors. Unlike past recessions, there wasn't the one mega-carrier bankruptcy or closing that immediately took, say, $3 billion of capacity out the market. That immediately caused an imbalance in supply and demand, favoring shippers. But some executives feel that pendulum is swinging back in favor of the carriers as industrial and retail demand recovers.

Perhaps the carrier with the biggest impact in trucking these days is YRC Worldwide. Rivals say it's nothing personal against CEO Bill Zollars, a nice enough guy, it's just that they were counting on YRC's battle with bankruptcy to fail—and take perhaps as much as $5 billion of capacity out of the market. Instead, Zollars engineered a debt-for-equity swap that basically diluted current YRC shareholders' worth by 90 percent, and the company has stayed in business, albeit with a smaller footprint.

"YRC used to be a four-legged stool, comprised of employees, shippers, banks, and shareholders," says Jindel of SJ Consulting, a firm that closely tracks the LTL sector and produced the market share charts for this Special Report. "With this debt-for-equity swap, they have gone to a three-legged stool—the stockholders have gone away. You can still balance something on a three-legged stool, but the third leg is now the shippers. If they were to leave, YRC could not survive."

Jindel believes that YRC could still get out of the woods, but only if all their management and employees are single-mindedly focused on getting more profitable freight into its networks.

Others are echoing Jindel's analysis that YRC is not yet out of the financial woods. Some analysts are saying that YRC's financial position is still precarious, and that it still might have to further downsize or exit the market completely.

"From a cash flow standpoint, there certainly is the possibility for more carriers to fold before the economy picks up again," says Phil Pierce, executive sales director for Averitt Express (No. 13 on *LM*'s Top 25 LTL list). "You simply cannot survive without cash flow."

Other carriers agree. Old Dominion's Congdon says, "There is a minimum 15 percent to 20 percent overcapacity" currently in the $25.6 billion LTL sector. And some carriers have even more." Others are more sobering in their view. According to analyst Larkin: "The unfortunate reality is that capacity will not likely exit in a big way over the near term."

Carrier executives seem intent on increasing yields. John Labrie, president of Con-way Freight, says that demand is

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improving and the economic indicators are clearly showing an improved economy. "I think that will continue this year," he says. "LTL is more affected by supply side than demand. We're in excess capacity situation that's pretty severe and it's going to take service to offset that excess supply. Customers have lots of options."

Issue #2: Pricing

The past three years of overcapacity has led to bargain-basement pricing, carriers say. The YRC situation exacerbated that as some non-union rivals "went for the kill" with pricing that was nearly predatory, some rivals say. But that is not expected to continue much longer.

"There's some crazy stuff going on out there," Old Dominion's Congdon says of rates. "Some of our competitors are pricing at unsustainable levels."

With this in mind, shippers should be bracing for higher rates, though perhaps not this year. Jindel is forecasting LTL rate increases of just barely 1 percent or so. Truckload rate increases might even be higher, as some owner-operators parked their trucks in mid-2008 and have not returned.

The pricing worm appears to be turning in TL as well. According to Mark Rourke, president of the truckload division of Schneider National (No. 2 on the *LM* list of Top 25 TL carriers), even with the fragmented TL market, rates are rising. "There's a firming of capacity and demand the last couple of months," says Rourke. "Whether it's capacity coming out or more demand on a macro level, it's uncertain."

Spot truckload rates, which at the depth of the recession in late 2008 were some 20 percent to 30 percent less than contract rates, now in many markets are trending above contractual rates

ATA REPORTS FEBRUARY TONNAGE IS UP

ARLINGTON. Va.—The American Trucking Associations reported that its advanced seasonally-adjusted (SA) For-Hire Truck Tonnage Index dipped 0.5 percent in February following a revised 1.9 percent January gain. February's decrease put the SA at 108.5 (2000=100), following a 109.1 January reading.

Despite the sequential decrease, the ATA said the SA was up 2.6 percent year over year, marking the third straight year-over-year gain. The ATA added that for the first two months of 2010, SA tonnage was up 3.5 percent compared to the same time a year ago. This is a better beginning to the year than 2009 when the SA was down a revised 8.7 percent), which marked its largest annual decrease since the 12.3 percent decline in 1982.

The ATA also reported that its not seasonally-adjusted index (NSA), which represents the change in tonnage actually hauled by fleets before any seasonal adjustment, hit 97.6 in February, which was down from January's 99.5 but up 2.6 percent year over year.

ATA Chief Economist Bob Costello said in a statement that February's tonnage reading is somewhat difficult to gauge due to the various winter storms that occurred in February, especially on the East Coast. Despite February's weather, Costello said that he is optimistic about the industry's recovery prospects.

"I continue to hear from motor carriers that both the demand and supply situations are steadily improving," said Costello. "Certainly it will take a while to make up the ground lost during the recession, but the industry is on the path to recovery." Costello added that he expects to see some volatility on a month-to-month basis throughout this year, but the trend line should be for moderate growth.

—Jeff Berman, Group News Editor

FEBRUARY WEATHER CITED FOR FLAT GROWTH

LOUISVILLE, Ky.—Harsh weather conditions in February had a negative impact on economic growth, according to the results of the Ceridian-UCLA Pulse of Commerce Index (PCI), leading to flat economic growth over the first two months of 2010.

The PCI, according to Ceridian and UCLA, is based on an analysis of real-time diesel fuel consumption data from over-the-road trucking and is tracked by Ceridian, a provider of human resources and prepaid card payment services. The PCI data is accumulated by analyzing Ceridian's electronic card payment data that captures the location and volume of diesel fuel being purchased by trucking companies.

The PCI had a strong start to the year with a 0.6 percent gain but fell in February by 0.7 percent. December's PCI was up 2.8 percent. Unlike previous PCI readings, UCLA and Ceridian said that the February PCI was adjusted for monthly workdays, which they said create less volatile month to month index changes.

"This change is a correction for work days and traditional seasonal adjustment," said Edward Leamer, director of the UCLA Anderson Forecast and PCI chief economist. "We discovered that the weekend days have about half the volume of diesel fuel transactions as the weekdays; and because that varies from month to month as the year changes, that creates a lot of volatility due to the number of weekend days and week days in any given month."

Leamer explained that on average, a weekend day sees 46 percent of the diesel fuel consumption that is seen during a week day, but it is lower in the Northeast, which has a 36 percent diesel fuel consumption rate. In turn, there is little difference between week days and weekends in the Mountain region.

Prior to this adjustment, the PCI mainly focused on a three-month rolling average for diesel fuel consumption to eliminate varying up and down swings, which mostly had to do with differences in workdays, said Leamer. Now that the PCI takes a month-to-month approach towards its data, Leamer explained that after a strong December, the first two months of the year are flat.

"Of the 5.9 percent fourth quarter GDP growth, 3.9 percent had to do with inventories, which is not a sustainable phenomenon," said Leamer. "It is very volatile and has no sort of persistence to it. Most people look at that GDP number as 2 percent growth quarter. If we have 2 percent growth quarters the rest of the year, the job market is going to remain dismal."

Ceridian Vice President and Index Analyst Craig Manson told *LM* that despite the flatness in the current quarter, it is worth noting that year-over-year diesel fuel transaction volumes are up for the third straight month. December's increase was the first time that had occurred in 21 months.

—*Jeff Berman, Group News Editor*

in some head-haul lanes, Rourke says.

That has caused Schneider and other large TL carriers to examine their pricing, especially for the bottom 10 percent of their customer base. "We're going after that bottom 10 percent in a more aggressive fashion," says Rourke. "More of those rate increases are sticking and we're now taking a much firmer look at pricing."

Issue #3: Recapitalization

Trucks do not last forever. As wonderfully engineered as the modern 18-wheeler is, that $125,000 bundle of steel, rubber, and computer microprocessors tends to wear out. And while carriers slashed their capex budgets during 2008 and 2009, they now say that the time has come to trade in those 5-year-old and 6-year-old trucks in favor of the newer, more fuel efficient, EPA-compliant 2010 models.

"If you look at our industry's lack of investment in equipment the past couple of years…that's unsustainable," says Schneider's Rourke. "Our rolling stock wears out and we need to recapitalize our industry."

The two main drivers holding back freight rates, trucking executives say, are consumer spending and expansion of manufacturing. Both are linked directly to the credit markets, which still have not recovered to pre-2008 levels. But if credit loosens, some carriers expect freight flows to be robust—and shippers will have to pay more.

"Pricing is way too low right now," Con-way's Labrie says flatly. "The industry is not producing enough profits to recapitalize our asset base. I would not call pricing irrational; in fact, it's been very rational, reflecting supply and demand. But it needs to change in order for this asset-heavy business to recapitalize itself."

Issue #4: Diversification

For more than a decade, truckers have tried to offer exactly what the marketplace wanted. That has caused once regional

"This is the 'Big Kahuna.' It's a game-changing moment."

— Steve Williams, Maverick Trucking

LTLs to expand coverage to become virtual long-haul carriers. Pitt Ohio and Averitt are charter members of the Reliance Network, an interline long-haul arrangement that has exceeded $1 billion in revenue in its first two years.

ABF Freight System, once a traditional long-haul carrier, has branched out into the regional markets through its new network for under 500 mile shipments. "We are the only carrier operating parallel regional and national line-haul networks, which enables ABF to offer reliable next-day, second-day, and transcontinental service without the hassle of processing multiple drivers from the same company every day," says ABF's Slagle.

Truckload carriers are changing as well. Schneider has recast its business model so that now 30 percent of its volume is regional, up from the low single digits just a few years ago. It's also expanding its mix of freight, expanding its offerings in the food and beverage sectors, and has continued to take over some private fleets, a segment that remains a $300 billion slice in the nation's $745 billion freight transportation pie.

One leading LTL carrier recently hired a person from the commercial airline industry who had a doctorate degree in operations research involving airline traffic. After one week of dealing with the load complexity at this trucking company, she

"The past couple years are the worst that I've seen in my 37 years in the business. While we have seen some incremental improvements, there has not been a material change."

— Ray Slagle, ABF Freight System

remarked to a colleague: "Compared with trucking, optimizing air freight is like a preschool program."

And network reengineering is a task that never ends in trucking. Greg Lehmkuhl, executive vice president of operations at Con-way Freight, says reengineering is an ongoing exercise at Con-way, with teams of research engineers constantly developing tools and models to modernize its own network as well as tweaking freight flows and forecasts of freight demands from customers, which vary widely from month-to-month as well as seasonally. "Nothing is more competitive than the LTL industry," Lehmkuhl says.

Old Dominion set out its diversification plan in 1997. Once exclusively a Southeast regional carrier, Old Dominion now pursues freight in all regional markets and fills out with global and expedited services. It now has 5 percent market share in the LTL sector. "That's a respectable share, but we see room for more growth, especially with smaller accounts," adds CEO Congdon.

Message from carriers to shippers

The overall industry simply can't go on with its current state of excess capacity and unsustainable pricing levels. Trucking has had negligible price increases for three years while its costs have continued to rise.

The message from carriers to shippers is blunt: Be prepared for price increases to start this year and continue in proportion to the strength of the economic recovery.

"We operated at a 94.2 operating ratio last year," Old Dominion's Congdon's says. "But the rest of the LTL industry was at 105. Ex-

CAPACITY DRIVING POTENTIAL VOLUME/RATE UPTICK

NASHVILLE—A fourth quarter survey of roughly 100 trucking carriers conducted by Transport Capital Partners (TCP) indicated that trucking companies are optimistic about market conditions, especially if rates and volumes go up as they suspect.

This mindset appears to be ongoing based on the results of TCP's recently released "Business Expectations Survey." A prevalent theme of the survey focused on projected 2010 rates and volumes. For large carriers—with revenues over $25 million—TCP found that 64 percent expect rates hikes, compared to 37 percent of smaller carriers with revenues below $25 million.

As for volumes, TCP found that more than 70 percent of large carriers expect volumes to rise in the next 12 months compared to the last 12 months (about 10 percent more than small carriers), with slightly more than 30 percent of small carriers and about 25 percent of large carriers calling for volumes to remain the same. Only 5 percent of small carriers anticipate volume declines.

TCP Managing Partner Lana Batts told *LM* that the projected rate increase is directly related to the ongoing excess capacity in the trucking sector. This is simply due, said Batts, to the fact that when there is excess capacity rates go down.

"Carriers have not purchased a substantial number of trucks over the last three years, and last year was a perfect example of that with only 90,000 Class 8 trucks purchased," said Batts. "We have always expected that, just to maintain a 'normal' replacement cycle, it took more than 250,000."

This point was further validated by a research report from BB&T Capital Markets analyst Tom Albrecht that said that a number of Class 8 tractors 8 years old or newer has shrunk by 13 percent or 211,000 units. In short: fleets are getting older and smaller.

While the trucking sector has had its fair share of bumps and bruises in the recent past, Batts pointed out that rates are stabilizing not declining, adding that in some spot areas there are equipment shortages. These areas include dry van capacity in the Midwest due to a rebounding automotive market.

Another factor cited by Albrecht's report was the Monthly Market Demand Index (MDI) from the Internet Truckstop. An MDI above 7 benefits truckers while below 7 benefits brokers and shippers. Batts said the MDI was as low as 1.43 in February 2009 and is now above 7.

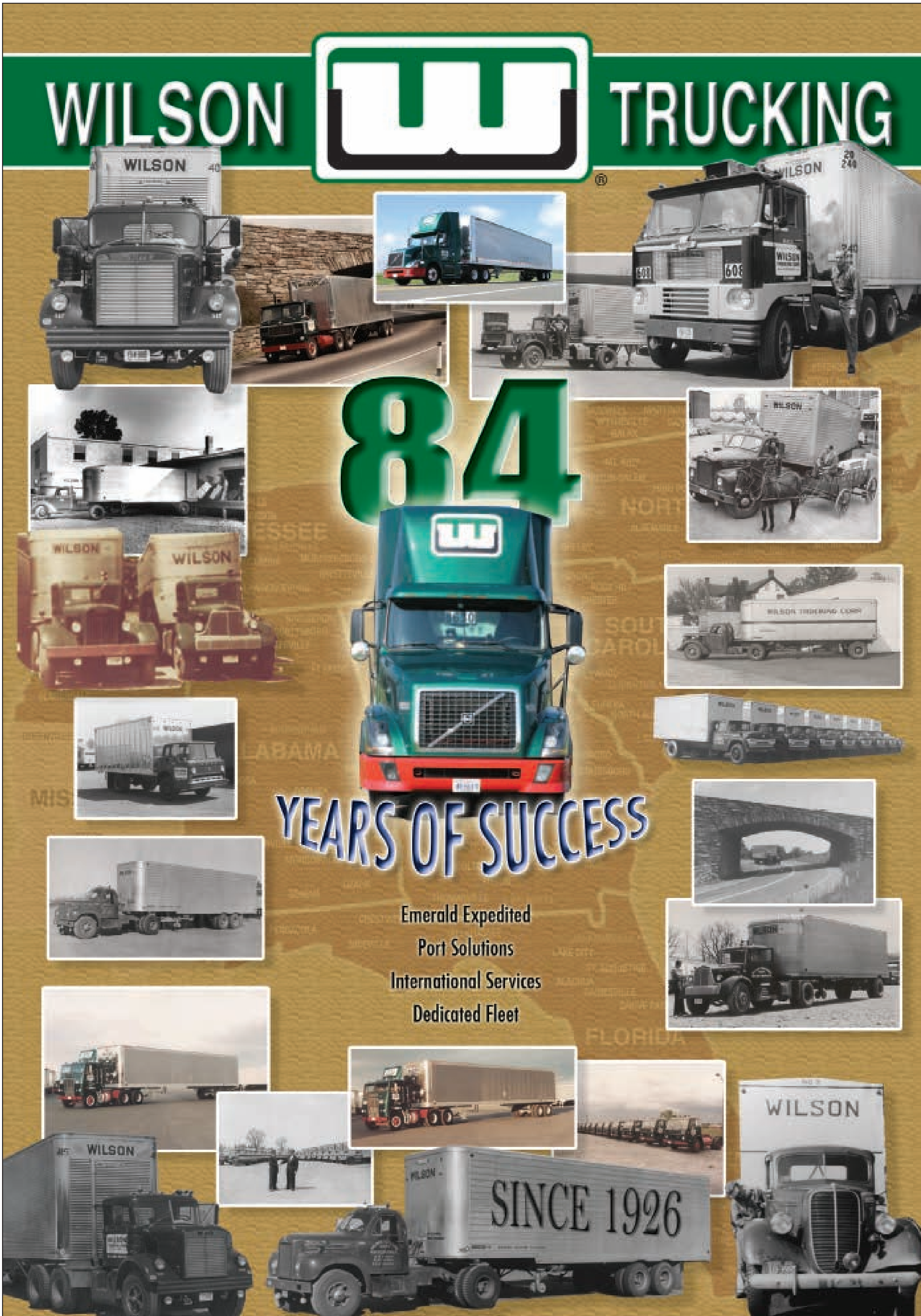
"The spot market tends to be an indicator of what is going to happen in the contract market," added Batts. "And even though carriers have contracts with shippers for mega-bid packages [not dedicated], the shipper does not guarantee traffic, and the carrier does not guarantee trucks. All they have negotiated is price."

This has led to a situation where shippers have continually re-bid packages and are now under a false illusion that there is going to be capacity to go with those rates, said Batts. But this will not happen, she said, because that capacity is going to go to the higher rate and not the lower rate.

The TCP survey data found that 45 percent of respondents will add capacity when the current fleet is fully utilized and rates increase significantly, while roughly 15 percent cited they will not add capacity until the economy improves and is more stable.

What's more, TCP noted that large carriers are twice as likely not to add capacity until their fleet is fully utilized and rates increase sufficiently; whereas smaller carriers are waiting for the economy to stabilize; which, TCP said, could explain why a higher portion of smaller carriers are currently adding capacity compared with larger carriers.

—Jeff Berman, Group News Editor



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YRCW REPORTS $622 MILLION LOSS IN 2009

OVERLAND PARK, Kan.—In a recent 10-K report, less-than-truckload (LTL) transportation services provider YRC Worldwide (YRCW) reported a $622 million net loss in 2009.

The company did not make this information available during its fourth quarter earnings release because it was in the process of completing its income tax provision that was part of its now completed debt-for-equity exchange in which it received tenders—or exchange offers—for roughly $470 million, representing about 88 percent of its outstanding notes.

The $622 million net loss came along with $5.3 billion in operating revenue, which was down 40.4 percent compared to 2008's $8.9 billion in operating revenue. The 2009 numbers were an improvement over the $976 million net loss the company posted in 2008.

YRCW's financial condition has been closely watched by industry observers due to the extensions leading up to the debt-for-equity exchange as well as the difficult LTL market conditions caused in large part by excess capacity, decreased fuel surcharge revenues, and pricing issues. The current market has also led to lower tonnage volumes across the board for YRCW, with fourth quarter shipments per day at YRC National Transportation down 39.9 percent.

Despite these losses, YRCW Chairman and CEO Bill Zollars is optimistic about where the company is headed. In a Web video for customers, he explained that 2009 was a year that "tested YRCW's strength as a corporation, and [YRCW] did more than prove the cynics wrong, not only by surviving the worse business downturn since the Great Depression but by positioning YRCW to grow financially and operationally."

Zollars cited how YRCW accomplished the integration and rightsizing of its Yellow and Roadway networks, executed the turnaround of its regional business, implemented cost-reduction and process improvements, and concluded its debt-for-equity exchange offer, which he said improved the company's balance sheet and liquidity.

"Our comprehensive recovery plan, which was the basis of our efforts in 2009, continues to guide us as we move through 2010. We are optimistic and we are confident," said Zollars. "And above all, we continue to win back business and gain new customers every day."

Last month, YRCW reported that it's seeing improving first quarter shipment trends at YRC National Transportation and YRC Regional Transportation. Company officials explained that shipment volumes in the latter end of December and early January were affected by the extensions to its note exchange, along with difficult weather conditions in January and February having a negative impact on shipment growth.

Continuing to keep costs in line will remain a major part of YRCW's strategy, according to Zollars. Recent media reports noted that YRC has eliminated roughly 2,000 jobs since the end of 2009. A *Kansas City Star* report quoted Zollars as saying by the end of 2010 YRCW plans to take out an additional $300 million in annual costs, with $200 million removed by the middle of this year.

Stifel Nicolaus analyst David Ross recently wrote that he remains skeptical of YRCW's long-term viability, although the company likely has sufficient access to funds to operate through 2010 after undergoing a complicated out-of-court financial restructuring to eliminate near-term debt payments.

"A high-degree of uncertainty lingers, in our opinion, around the company's future," wrote Ross.

—Jeff Berman, Group News Editor

cluding YRC, it was 101. That is not sustainable. We have to get some pricing improvements and I certainly anticipate that we as an industry will we get them."

If shippers want a hint of their rates, just look at the government numbers regarding industrial capacity, Gross Domestic Product, and other productivity trends. Unemployment, which is still 10 percent and forecast to stay above 6 percent through 2015, is one number truckers look at regularly.

"In the end it's consumers," Congdon says. "These industrial numbers may be rising, but unemployment greatly offsets everything that's going on. If you're unemployed, you're not buying. Those people employed are not spending as much as they once did. We have to get our consumers back out there spending and to do that we have to get that unemployment number down."

Analyst Jindel is calling for a modest economic recovery: "I'm not finding any hopeful signs that life for LTL carriers will get better any time soon. It will be a very slow process in improving tonnage levels. Things are getting lighter and smaller; and that does not portend well for an industry that bases its pricing on weight."

What should shippers expect? In two words: rate increases.

"We've been chopping at the bottom for several months," Schneider's Rourke says. "Pricing will certainly go north, no question. Whether that's in a big way in 2011 or starts to manifest itself in 2010, that is the big question. That's our crystal ball moment for this industry."

John D. Schulz is a Contributing Editor to Logistics Management


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PUBLISHER'S LETTER

SCMR Enters a New Era

Brian Ceraolo, Publisher

Dear Reader: This May/June 2010 edition of *Supply Chain Management Review* marks a new beginning for us. It's our first issue published under our new company, Peerless Media, LLC. In addition to *SCMR*, Peerless Media is publishing several other leading publications you may be familiar with—*Logistics Management, Modern Materials Handling*, and *Materials Handling Product News*.

In one important sense, you won't notice any changes. *SCMR* has been the premier supply chain publication since 1997 and we intend to keep it that way. Frank Quinn, the publication's founding editor, will continue to lead the editorial team. All of our highly acclaimed columns and departments—Global Links, Insights, Technology, Supply Management, and Leadership—will stay in place.

Perhaps most importantly, *SCMR* will continue to deliver on the thought-leadership articles that have always set us apart. These are the in-depth case studies, research reports, and insightful analytical pieces from experts in the practitioner, analyst, consulting, and academic communities.

But while we plan to keep the foundations of *SCMR* in place, we don't intend to stand still. We can now be more flexible and responsive than ever before in responding to your information needs. In particular, we plan to focus on major enhancements to our web site (www.scmr.com), e-newsletters, web events, and other online offerings.

We're pleased to be entering a new era—and happy to have you with us!

Best regards,

Brian Ceraolo
Group Publisher
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