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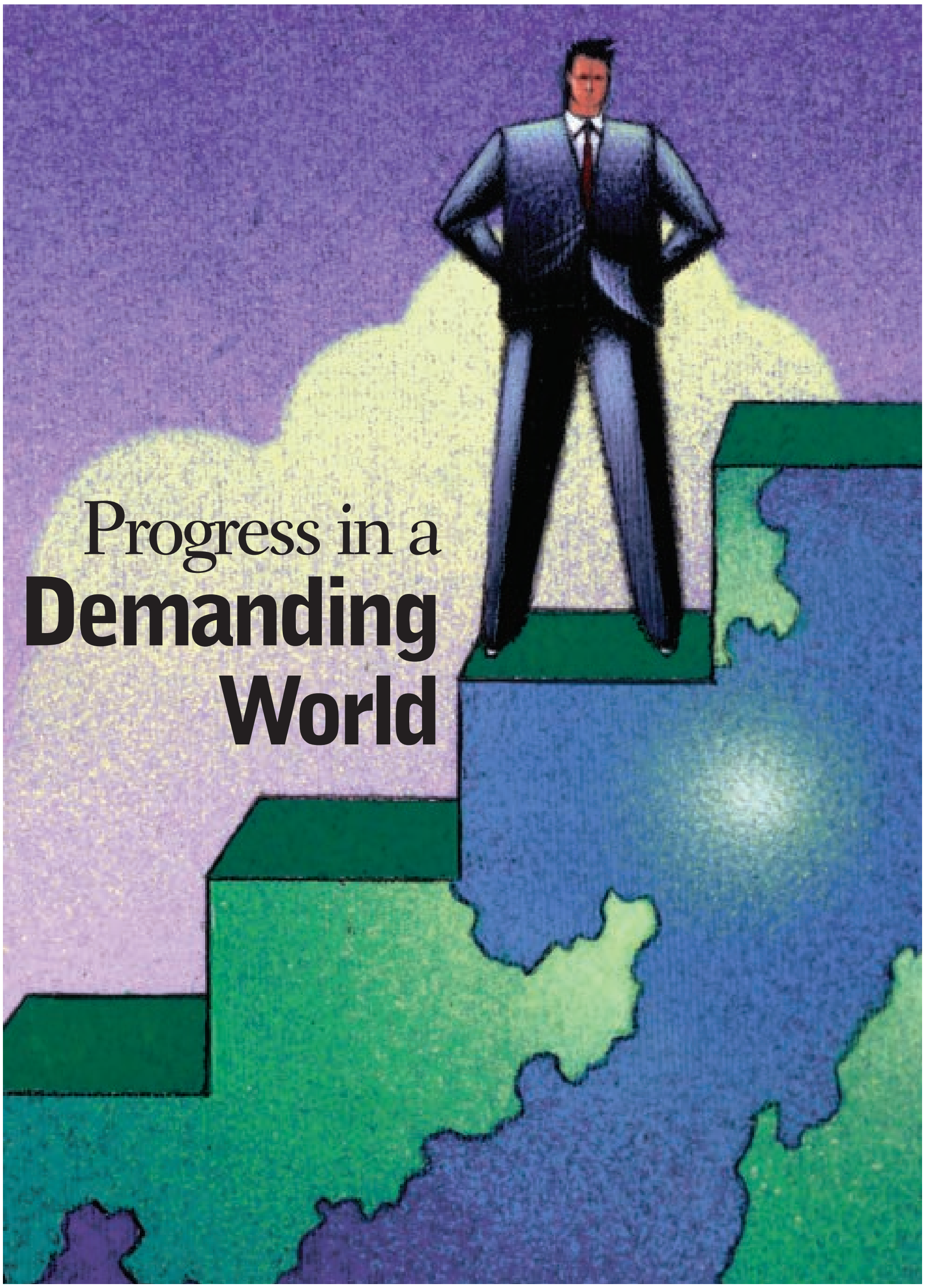

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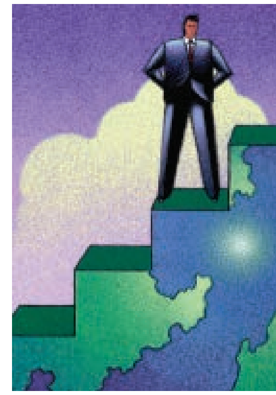

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The Payoff in Persistence

Frank Quinn, Editor
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Calvin Coolidge was not one of our most loquacious presidents. There was good reason he was known as "Silent Cal." But every so often he came out with something truly exceptional. His quote I like best is about persistence: "Nothing in the world can take the place of persistence. Talent will not; nothing is more common than unsuccessful men with talent. Genius will not; unrewarded genius is almost a proverb. Education will not; the world is full of educated derelicts. Persistence and determination alone are omnipotent. The slogan 'Press On' has solved and always will solve the problems of the human race."

I was reminded of President Coolidge's remarks while reading the articles in this March/April issue. Throughout, there's a subtext of persistence and determination—a recognition that, yes, the economy could be better and global trade is getting so complex, but dammit our supply chain still must soldier on in support of the business mission.

Our annual Survey of Supply Chain Progress, now in its ninth year, has always stressed the virtue of persistently striving to improve the supply chain. The findings have shown the companies that work at it most diligently—the supply chain leaders—consistently outperform the others along key metrics. In this year's survey report, we specifically examined how the leaders' competency in supply chain visibility, flexibility, and use of analytics translated to superior performance and to overall supply chain progress.

The Global Trends Roundtable panel, moderated by Executive Editor Patrick Burnson, confirmed the need for persistence in coping with today's formidable supply chain challenges. Our expert panelists painted a picture of volatile energy prices, growing supply chain risk, new regulatory requirements…in short, a pretty tough environment in which to operate a supply chain. But the panelists say it can be done by hanging tough, collaborating with key partners, and using technology to modify risks and streamline operations.

One risk, in particular, can be especially troublesome. It's the wild price swings that can accompany the various commodities purchased. But while we may never be able to completely take volatility out of the commodities equation, write George Zsidisin and Janet Hartley in their article, we can take steps to mitigate the risk. The authors offer six proven tactics for taming the beast that is known as commodity risk.

Persistence comes in handy when you're trying to make sense out of your corporate spend. As Constantine Limberakis of the Aberdeen Group points out in his feature article, too many companies still struggle with getting a handle on their spend. The poor quality of their spend data and related lack of visibility results in sub-optimum sourcing decisions, unnecessary work, and added costs. But by working to become more like the best-in-class profiled in the piece, companies can turn this situation around.

No, it's not always smooth sailing out there. But with a little persistence, progress will invariably follow.

Francis J. Quinn

SUPPLYCHAIN MANAGEMENT REVIEW

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BY LARRY LAPIDE

Parsing Holds Key to Better S&OP

For many global companies, a single Sales & Operations Planning process across the enterprise is no longer optimum. What's needed instead are multiple processes tailored to individual business units and regions.

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.

Growth in globalization and consumerism has led to complex supply chains that support the sales of broader and shorter lifecycle products into more and more countries. At the same time, supply lines are longer as companies manufacture and source on an anywhere-in-the-world basis. These developments have rendered the use of a single Sales and Operations Planning (S&OP) process unwieldy and cumbersome. Thus, as with any complex task, the S&OP process often needs to be parsed in order to "divide-and-conquer." But in doing so, there's an important caveat: you need to carefully consolidate the individual plans to get an accurate global enterprise view.

Research supports this view of S&OP. In 2006, a medical devices manufacturer asked MIT to research how S&OP processes could be effectively applied across its global business units (BUs). At the time the company was running two S&OP processes—one for each of its two BUs, which were focused on different products. It wanted to know whether two was best, whether one might be better, or should the S&OP processes be parsed even further. The research questions became the topic of a Master's thesis by Christopher M. Honstain, titled *Sales and Operations Planning in a Global Business*.

A number of practitioners and industry experts from consulting and software firms were interviewed. In addition, the researchers examined the S&OP practices of three specific companies: a consumer-product goods (CPG) company, a pharmaceutical company, and a petro-chemical company.

The CPG company had some best practices in global S&OP. It conducted over 90 monthly S&OP processes around the world and divided the process along BU, product group, and geographical dimensions. The company clustered business entities to best represent "pure" profit-and-loss (P&L) centers in which demand-supply planning decisions could be made assuming a unique set of supplying plants for each demand cluster. For each business unit there was a BU-based process owner. In addition, there was a corporate-wide process owner responsible for coordinating efforts, as well as providing rough process guidelines, self-assessment tools, and assistance in assessing the performance of each process. The finance organization consolidated and harmonized the S&OP plans to provide corporate executives with a consolidated enterprise-wide plan.

Other research we conducted confirmed the need to parse S&OP processes, focusing on supply-demand characteristics. Demand characteristics include geography, channels, and product demand patterns; supply characteristics include sourcing, production, and distribution resources.

The research also underscored the need to consolidate parsed plans in order to "harmonize" them whenever there is limited worldwide supply, and to ensure they are aligned to meet corporate goals and objectives. (Harmonizing in this context involves making sure that plans are consistent, non-conflicting, and supportive.) The processes should follow a common set of rough guidelines and have a consistent set of process performance objectives. Otherwise, plans would not be "apples-to-apples", making consolidation difficult or impossible.

A problem uncovered during the research was the disconnect that often existed between marketing and finance organizations. This was manifested in the frequent misalignment of financial versus S&OP plans. To correct this, finance organizations need to get more involved in the processes, so that S&OP plans can be more precisely translated into financial terms.

Recommended Parsing Criteria

A global S&OP process ought to be parsed into multiple processes so that each represents a pure P&L center (at least to the extent possible). Honstain in his thesis offers this observation: "Within the supply chain, the characteristics of the manufacturing sites are the deciding factors for the number of S&OP processes. The specific characteristics that are important are the number of plants within each region, whether the plant is dedicated to the region or it is shared between the regions, and whether or not the plant is centrally controlled or decentralized."

"Regions" are business units or marketing/sales territories, typically defined as North America, South America, EMEA (Europe, Middle East, and Africa), and Asia. Criteria on how to parse a global S&OP process vary depending on four supply-based scenarios:

1. *Single Worldwide Source:* This is the simplest scenario in which one—and only one—plant supplies product on a global basis to all regions. Under this scenario, one S&OP process suffices and there is little reason to break it up.

2. *Multiple Regional Source:* Under this scenario, multiple plants around the world supply product. However, only one plant is dedicated to supply product to each region. A plant may supply multiple regions, but no other plant serves them. Parsing the S&OP is recommended under this scenario. Each S&OP process would be defined to include all regions that have common product supply. The demand forecasts for these regions would be consolidated, thereby establishing a pure P&L center for each S&OP process.

3. *Dedicated Regional Source:* Under this scenario, multiple plants throughout the world supply product. However, each plant is dedicated to supply product to one and only one region; that is, plants do not supply multiple regions. Under this scenario, each region would conduct its own independent S&OP process as a pure P&L center.

4. *Multiple Shared Sourcing:* This scenario is complex, yet it is the most prevalent. There are multiple plants throughout the world that supply product and each region can be served by one or more plants. This is the most complex scenario because supply is shared among regions. Centralized management is required to ensure that global enterprise goals and objectives are met when there is contention among regions for constrained product supply. Each region with a supply source should run its own S&OP process under this scenario. Regions that don't have a supply source in them should be grouped into regions that do. The outputs from the individual processes would become the inputs to an executive-level S&OP process that consolidates them to develop the enterprise-wide global plan.

Finance organizations need to get more involved, so that S&OP plans can be more precisely translated into financial terms.

Consolidated View Needed

Since most global companies are comprised of some combination of the four supply scenarios described above, consolidating and harmonizing multiple S&OP plans at an executive level is critical for obtaining a global picture of the future. As part of this, companies need to accurately translate their unit-based (i.e., non-monetized) plans into financial plans so as to align S&OP plans with enterprise-wide goals and objectives.

Whenever I've discussed parsing a global S&OP process, I've talked about the cautionary Humpty Dumpty nursery rhyme. When he fell off the wall, "all the King's horses, and all the King's men, couldn't put Humpty together again." In S&OP, you can use the criteria discussed above to parse your global S&OP process. But if you don't parse correctly, like Humpty Dumpty, it is not an easy task to put the S&OP plans back together again. So be careful!

BY PATRICK BURNSON

Lessons for Shippers from the Maritime Disasters

Recent well-publicized vessel losses highlight the need for stronger chain-of-custody laws and tighter controls on "Flags of Convenience."

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

When the Italian cruise ship, Costa Concordia, ran aground in the Tyrrhenian Sea in January, lawyers and investigators began a frenzied search for actuarial evidence. Who owned the vessel, and what were the terms of its charter agreement? The same question was being asked months earlier when the container vessel, Rena, crashed against hidden shoals off the coast of New Zealand. One incident (a consequence of negligence) involved the loss of many lives. The other (an Act of God) was an environmental disaster. After weeks of diligence, it was discovered that both vessels belonged to Diana Shipping, a unit of Greece's Costamare, Inc. There was one other common denominator, too: The Costa and Rena were sailing under "Flags of Convenience."

Supply chain professionals could learn several lessons from these cautionary tales. But the main one will be the implications of chain-of-custody rules on the high seas and on point-to-point distribution of cargo in a segmented pipeline.

Flags of Convenience—a vessel carrying the colors of a country not its own—have proliferated with globalization and the constant pressure for lower rates. Vessel operators have been able to save on registration fees, low-wage labor, and a very forgiving tax structure by "flagging out" to a nation like Panama or Liberia. Consequently, there is often no visible link or relationship to the real owner. Some of these registers have poor safety and training standards, and place no restriction on the crew's nationality.

Furthermore, because of language differences, seafarers are not able to communicate effectively with each other, thereby putting safety and the efficient operation of the ship at risk. In many cases these flags are not even run from the country concerned.

This may soon be changing, however. Thanks to the efforts of the International Transport Federation, Flags of Convenience (FOCs) may soon be required by several regulatory agencies and sanction bodies to take into account the degree to which foreign owned vessels are registered. The following additional criteria also must be provided when declaring to register an FOC:

- The ability and willingness of the flag state to enforce international minimum social standards on its vessels, including respect for basic human and trade union rights, freedom of association, and the right to collective bargaining with bona fide trade unions.
- The social record as determined by the degree of ratification and enforcement of International Labor Organization's conventions and recommendations.
- The safety and environmental record as revealed by the ratification and enforcement of International Maritime Organization's conventions and recorded by port state control inspections, deficiencies and detentions.

Rotterdam Rules

Booking freight on FOCs is not the only concern shippers should consider this year. Indeed, arguably a more significant risk factor may be related to pending changes in the United Nations Convention on the Law of the Sea (UNCLOS). A whole new layer of actuarial exposure to risk may soon be created with the U.S. adoption of the Rotterdam Rules this year.

"The Rules"—formally the United Nations Convention on Contracts for the International

Carriage of Goods Wholly or Partly by Sea—is a treaty revising the legal and political framework for ocean carrier transport. The Rules establishes a modern, comprehensive, uniform legal regime governing the rights and obligations of not only shippers, but also carriers and consignees under a point-to-point contract. As a consequence, the Rules will extend and modernize international compliance now on the books and will achieve long-sought uniformity of admiralty law in the field of maritime carriage.

Signers to new Rules include the U.S., France, Denmark, the Netherlands, and Switzerland. Greece, which is one of the leading FOCs, is also endorsing the law. This is encouraging news for a variety of reasons as Greece and these other five signatories comprise up to 25 percent of world trade by volume.

The World Shipping Council—a prominent supporter of the Rotterdam Rules—has joined the National Industrial Transportation League in urging Senate ratification as has the American Bar Association House of Delegates.

Besides obligating carriers to have ships that are seaworthy and properly crewed throughout the voyage, the Rules eliminates the "nautical fault defense" that had prevented carriers and crewmen from being held liable for negligent ship management and navigation. At the same time, it allows for more e-commerce and approves more forms of electronic documentation. This particular aspect has been welcomed by NVOs (non-vessel owner-operators), and third-party logistics providers who heretofore had been forced to generate mountains of costly paperwork.

Among other main provisions, the Rules extend the period of time carriers are responsible for goods at sea which are then moved to another modal link. It also increases the limit liability of carriers to 875 units of account per shipping unit or three units of account per kilogram of gross weight. It extends the time that legal claims can be filed to two years following the day the goods were delivered or should have been delivered.

There are some loopholes, however. Volume shippers (the Walmarts of the world) can opt-out of some of the liability contained in the Rules if they have other insurance policies covering the full leg of the journey.

Speaking to WSC president, Chris Koch recently, *SCMR* learned that Senate ratification of the Rules is moving at "a glacial pace." Koch believes, however, that passage is assured and that shippers should prepare for "a new order" before the year is out. The chain-of-custody issues are ignored at the shipper's peril, as ever, and the liability related to vanished cargoes is not limited to the FOCs only.

Containers Lost at Sea

Even with proper loading of the cargo into the container and secure stowage aboard ship, a number of factors—ranging from severe weather and rough seas to more catastrophic and rare events like ship grounding or collision—can result in containers being lost overboard while at sea.

By their most recent estimation, the WSC notes that hundreds of containers were cast overboard or so badly damaged that they became virtually worthless last year. But while these numbers are alarming, "catastrophic" events are rare.

The chain-of-custody issues are ignored at the shipper's peril, as ever, and the liability related to vanished cargoes is not limited to the FOCs only.

Total industry losses obviously vary from year to year. However these numbers are well below the 2,000 to 10,000 per year that regularly appear in the press, and represent a very small fraction of container loads shipped in a 12-month time frame.

Nevertheless, the industry continues to pursue measures to reduce the number of containers lost overboard to zero. One effort is the joint industry/government project, called Lashing@Sea3, led by the Maritime Research Institute of the Netherlands (MARIN). Another effort is the joint publication of Safe Transport of Containers by Sea: Industry Guidance for Shippers and Container Stuffers by the International Chamber of Shipping (ICS) and the WSC, which provides recommended best practices for ships, port facilities, and shippers in the loading and handling of cargo containers.

A related effort is the joint decision by the IMO, the International Labor Organization (ILO), and the United Nations Economic Commission for Europe (UNECE) to develop an IMO/ILO/UNECE code of practice for packing of cargo transport units, including containers. The WSC participates in a group of experts tasked with preparing recommendations on the draft code of practice with a target publication date in 2013.

A further, very positive development is the agreement by the IMO to review the issues involved, including agreement to consider the proposal of the WSC and ICS to require that the actual weight of every loaded container be verified and provided to the vessel operator prior to stowing aboard a ship. This, say experts, is crucial because "misdeclared" weights have contributed to the loss of containers overboard as well as to other safety and operational problems.

What does all this mean for shippers now? The key concern, as always, is to be certain all of your actuarial exposure is protected by proper insurance policies. While more transparency is being readied for the ocean cargo supply chain, the "Beneficial Cargo Owner" is the one who must in the end pay the price.

TALeNT STRATeGIES

Is Talent Management the Next Frontier for S&OP?

By Jim Rice and Daniel Stanton

Jim Rice (jrice@mit.edu) is Deputy Director, MIT Center for Transportation & Logistics (CTL). Daniel Stanton is Supply Chain Professional Development Manager, Caterpillar Logistics Inc. He can be reached at Stanton_Daniel@cat.com.

Supply chain management is not the only function that is grappling with the problems of matching supply and demand in a highly uncertain business environment. HR faces similar challenges. But with HR, the mandate is to deliver people—not products—to the right place, at the right time, at the right quality, and in the right quantity.

In fact, the "personnel supply chain" obeys many of the principles that govern its goods-carrying counterpart. Which begs the question: Can demand management methods that have been tried and tested in the goods distribution universe be applied to the movement of individuals? We think that the answer is yes, in the form of Sales & Operations Planning (S&OP).

As we describe below, Caterpillar Logistics Inc. is using S&OP practices to manage its talent pipeline. In addition to bringing more rigor to HR processes, the company is using the process to help improve its staff recruitment and retention programs in critical areas such as supply chain management.

Parallel Universes

The idea that the flow of talent is akin to the flow of product is not new. Wharton management professor Peter Cappelli describes the history of this relationship in detail in his new book *Talent on Demand: Managing Talent in an Age of Uncertainty* (Harvard Business Press, 2011). Many of the talent management challenges that companies face today are analogous to problems that have already been analyzed in the operations research field, Cappelli maintains.

Delve further and the challenges become familiar. HR managers are wrestling with the demands of globalization, business volatility, and a more complex mix of skills, at a time when planning horizons are contracting. They must ensure that their "inventory" of talent meets short- and long-term demands. When HR forecasts are off the mark, the result can be excess talent—and the possibility of damaging layoffs—or a scramble for new blood.

Supply chain managers also can relate to the day-to-day challenges faced by their counterparts in HR. Take, for example, the extreme swings in demand that HR folks deal with. It is not uncommon for a manager to navigate through a protracted recruitment program and be ready to send out job offers, only to find that the positions no longer need to be filled. Also keep in mind that, in general, it is far more costly to manage a supply of people than a supply of widgets.

But the reasons for extending S&OP to the talent pipeline go beyond the similarities between the respective supply chains. Operations managers are trained to use and appreciate tools such as S&OP; they are masters of program management and applying technology to real world problems. Moreover, they are taught to evaluate and redesign supply chains in line with the organization's strategic direction. HR managers, on the other hand, seldom have the opportunity to learn these technical skills. The HR team/function can benefit greatly from these disciplines—and, by extension, so can the company's talent management strategy.

It is becoming increasingly important to take talent acquisition and retention to a more effective level. As the MIT Center for Transportation & Logistics described in its spring 2010 white paper *Are you Ready for the Talent Management Crisis?,* the supply chain profession faces a serious shortage of talent. The types of skills required to run a supply chain are changing, as are the methods for finding and recruiting professionals. The emergence of new channels such as social media sites, online networks, and so forth, illustrates the many new options available to companies when seeking job candidates.

S&OP as Talent Management Enabler

In this environment companies that develop world class recruitment and retention programs can attract the best and the brightest. Cat Logistics offers a solid example. Harnessing the planning capabilities of S&OP to build and manage the Cat Logistics talent pipeline is part of the company's strategy to deliver superior results by maintaining global leadership and building the best team in the industry.

From a supply chain management perspective, the application of S&OP in the Cat Logistics talent management program is basic. From an HR standpoint, however, it is a leading edge application that could become a significant innovation in talent management.

For some time, Cat Logistics' managers have been required to submit a five-year business plan forecast, but this now includes an estimate of their group's headcount requirements over the period. These estimates are used to analyze workforce trends—which groups are growing and the rate of growth in different geographies, for example—at the departmental, divisional, and corporate levels.

And in much the same way that production forecasting must respond to variations in demand, so the HR process also has to be sensitive to demand signals. An economic downturn or strategic course change can transform the supply/demand picture quickly. There are also regional nuances in demand patterns to consider. In India employees might need regional knowledge such as an understanding of local differences in tax codes and infrastructural limitations, in addition to more general supply chain competencies. Postings in other countries, notably China, may require a different set of skills.

The projections are assessed in terms of alignment with corporate strategy to determine whether adjustments need to be made. This process is called Strategic Workforce Planning (SWP). It originates at the corporate level and is carried out at the business unit level, providing Cat Logistics with a global footprint of the human resource needs over a five-year period.

This planning process includes a tactical element. One-year estimates are derived from the five-year figures to provide more accurate forecasts of future staffing needs. By taking the number of people currently employed and the projected staffing needs one year down the road, and building in an allowance for losses through attrition, it is possible to generate a robust recruitment target for the following year.

The number of sources of "inventory" available to fill the gap between current and future needs is limited. Talent is recruited internally, from educational institutions, from other companies, or (increasingly) from the military. Recruits can be new graduates, mid-career, or senior professionals, employees or contractors.

S&OP enables Cat Logistics to manage these sources of talent more effectively. Armed with a more accurate picture of how many individuals they need to hire and what mix of skills is needed, Cat Logistics' HR managers can make smarter investments and derive more value from recruitment channels such as universities and search firms where appropriate.

Can demand management methods that have been tried and tested in the goods distribution universe be applied to the movement of individuals?

At present, the S&OP process is housed on a master spreadsheet that contains detailed forecasts at the global, regional, facility, and functional levels. Possible future refinements include automation of the data collection from managers and the ability to automatically update the reports—features that would greatly streamline the process.

Developing a New Consensus

The deployment of S&OP disciplines in the HR arena, still at an early stage, requires a more thorough knowledge of the process. Supply chain and HR professionals need to collaborate to further develop the approach. Cat Logistics is bridging these two functions, recognizing that the closer relationship is critical to the success of the company's S&OP-based talent management approach.

In an environment where everyone is busy, it can sometimes be difficult for HR to build support and maintain engagement from the operational team. Linda Smolek Abel, Strategic Workforce Planning Consultant for Caterpillar Inc., says, "An initial key to demonstrating SWP value at Caterpillar has been an intense focus on ensuring the process is easy, the data is accurate, and the results are useful."

It is also important to recognize that the learning process is two-way. Supply chain managers can benefit from the opportunity to appreciate "people" issues that are often overshadowed by the technical aspects of their role. These so-called soft issues are growing in importance for operations and HR managers because impending supply chain talent shortages impact both functions.

Spend Analysis: LESSONS FROM

By Constantine G. Limberakis

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New research from the Aberdeen Group underscores the criticality of spend analysis to overall spend management. The findings also show, however, that many companies struggle with putting together an effective spend analysis program. The insight and guidelines offered here can help any company advance up the competency ladder toward Best-in-Class—regardless of the starting point.

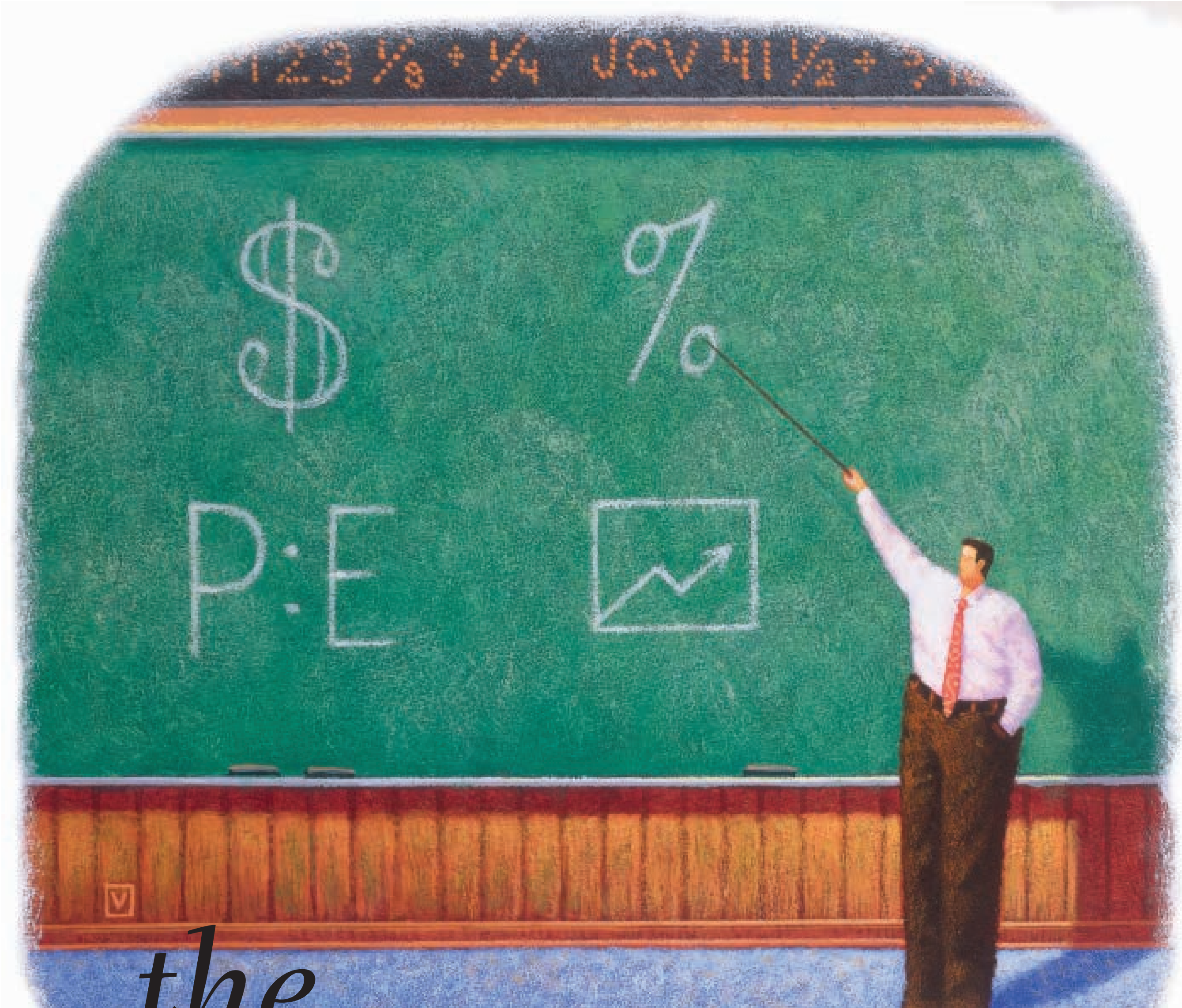
Companies today continue to struggle to obtain a 360-degree view of spend data. Those that can distinguish themselves as Best-in-Class organizations—top-performing enterprises measured on a series of distinct key performance indicators—not only extract, cleanse, classify, and analyze their spend data from multiple sources, but also leverage spend analysis as a predictive measure to improve spend compliance and reduce supplier risk through market and supplier data. The Aberdeen Group recently concluded an in-depth report examining the crucial set of processes that encompass spend analysis by exploring the pressures, strategic actions, and capabilities of 132 organizations surveyed globally. (For more on this research, see accompanying sidebar.)

Our research found that spend analysis, when performed correctly, provides the capability to increase visibility into spending, promote insightful sourcing decisions, and identify cost savings opportunities. However, the success of any supply management program is largely dependent upon the ability to properly access, organize, and analyze spend data. This requires a unique combination of process and technology to get spend analysis done right.

This article presents highlights of our research, focusing in particular on the key attributes of a successful spend analysis program and the characteristics displayed by Best-in-Class companies. The article then lays out the steps necessary to continually improve the spend analysis process at your organization—regardless of your current maturity level.

Business Context

Aberdeen research confirms that spend analysis programs remain a high priority for most procurement organizations. For example, 67 percent of 132 of survey respondents to our recent



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BEST-IN-CLASS

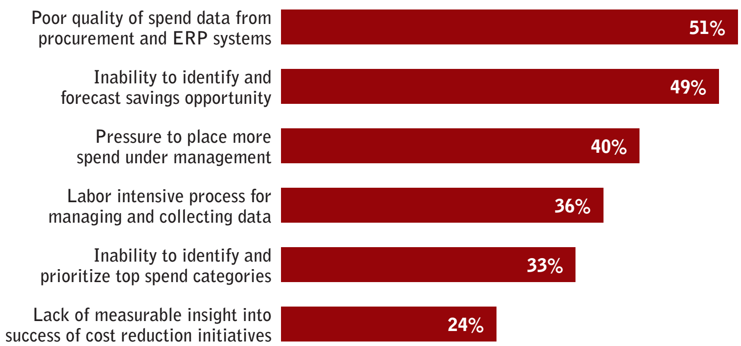
study, *Dynamic Procurement: CPO as Collaborator, Innovator and Strategist,* indicated that spend analysis is a high or top priority for their enterprise procurement program. Interestingly enough, this statistic jumps to 88 percent when looking at C-level executives exclusively.

Considering that spend analysis is so high on the priority list for procurement, it proves to be a dynamic exercise for most organizations. Effectively leveraging spend analysis requires integration of disparate data sources, clearly-defined data processes, and advanced technology. But it's important to emphasize that getting spend analysis right is not just about technology. It also requires coordination from several areas of the business like IT, supply chain and finance—but it starts with leadership from procurement. As procurement organizations face increased global market challenges in this current economic environment, procurement leaders cannot run the risk of missing savings opportunities and, therefore, must be able to address the key pressures surrounding spend analysis initiatives within their organization.

Our research continues to show that a core issue surrounding spend analysis is the poor quality of spend data—data coming from ERP, procurement, and sourcing systems—that results directly in an inability to identify and forecast savings opportunities. (Exhibit 1 lists the other main spend analysis issues cited by respon-

EXHIBIT 1

Top Pressures for Spend Analysis Initiatives



Source: Aberdeen Group, September 2011

dents in our most recent study.) With fully half of the organizations having three and four systems generating spend data, the quality of data becomes an exacerbated challenge—particularly given the ongoing use of manual spreadsheets or traditional data warehouses that are limited in the ability to accurately classify, normalize and enrich spend data. In this regard, 32 percent of respondents indicated they are still using basic spreadsheets as the primary approach to spend analysis.

The answer to these challenges, as demonstrated by Best-in-Class organizations, is investment in innovation. Automation is one example. Aberdeen research has shown that Best-in-Class organizations are 50 percent more likely to automate spend analysis processes and 124 percent more likely to have automated spend data collection from multiple sources than Laggards. (At Aberdeen, we define maturity levels as Laggards, Industry Average, and Best-in-Class, as discussed further below.) Another report showed that companies leveraging a "fully-automated" system for spend analysis experience an average savings of 11 percent from sourcing efforts, an example of converting automation into opportunity.

But as Exhibit 2 shows, even in those organizations already leveraging spend analysis as a strategic enabler, more investment is needed in automating data cleansing, classification, and enrichment in order to more accurately identify spend opportunities. In fact, 46 percent of respondents point to the use of technology to automate data-intensive processes as being most critical to the success of their spend analysis program. Yet today, many organizations lack the ability to manage such spend data initiatives in house. We've found that outsourcing spend analysis to turnkey spend data management providers (i.e., consulting/software-based solution providers) has become more common due to a lack of data analysis skills internally for managing certain processes inherent in spend analysis such as data cleansing and data enrichment.

The Maturity Class Framework

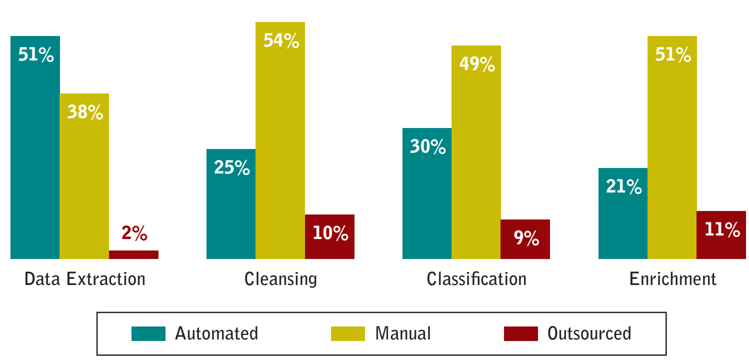
Organizations that effectively use spend analysis are marked by their capability to capture spend from multiple sources and to demonstrate savings as a result. The findings of this benchmark demonstrate that a variety of capabilities are necessary for improving or implementing a spend analysis program. Aberdeen Group analyzed the aggregated metrics of 132 organizations to determine whether their performance ranked as Best-in-Class, Industry Average, or Laggard. We identified the following three key performance metrics to distinguish among the three maturity categories:

- Spend captured in spend analysis efforts (factor focusing on automation/ability to manage from multiple sources).
- Cost avoidance savings based on spend analysis efforts (factor focusing on efficacy of spend analysis on working capital).
- Duplicate payments (factor demonstrating efficacy of spend analysis on P2P processes).

Exhibit 3 gives specifics of spend analysis performance for each of the three maturity levels.

EXHIBIT 2

Automation in Spend Analysis



Source: Aberdeen Group, September 2011

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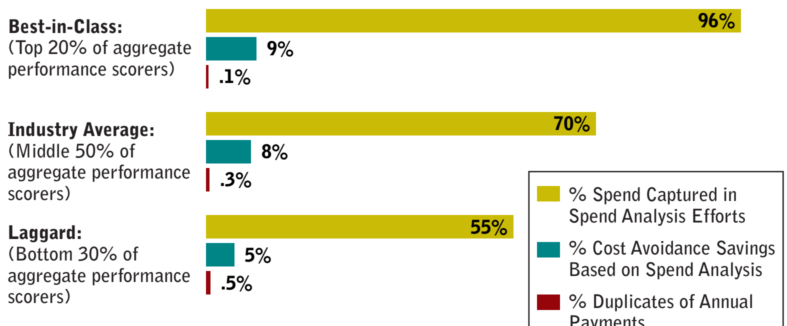
EXHIBIT 3

Top Performers Earn Best-in-Class Status



Source: Aberdeen Group, September 2011

In addition to having common performance levels, each class also shared characteristics in five key categories: (1) process (the approaches they take to execute spend analysis operations); (2) organization (corporate focus and collaboration among stakeholders); (3) knowledge management (contextualizing spend data and exposing it to key stakeholders); (4) technology (the selection of the appropriate spend analysis tools and the effective deployment of those tools). These characteristics (shown in Exhibit 4, on page 16) serve as a guideline for best practices, and correlate directly with Best-in-Class performance across the key metrics.

Capabilities and Enablers

Best-in-Class organizations have demonstrated a strong reliance on specific process, organization, knowledge, technology enablers, and performance factors to effectively improve spend analysis initiatives that lead to results. An Aberdeen research report, *Spend Analysis: Transforming Data into Value,* demonstrates that spend analysis can lead to a direct increase in spend under management from 20 percent to 35 percent. While the competitive framework presented above provides an overview of capabilities in general for spend analysis, the following discussion presents a deeper analysis of the comparative capabilities demonstrated by the leadership of Best-in-Class organizations.

Let's begin by examining some key capabilities within the context of a typical spend analysis process sequence, as shown here.

Extracting Spend Data

Extracting spend data from multiple sources, one of the initial stages of the spend analysis cycle, is critical for achieving true visibility into all the areas of spend. As we noted earlier, organizations are using a number of systems that describe spend data. And with 41 percent of respondents citing too many data sources and data compatibility as key barriers to improving spend analysis, improving the process of data integration for extracting data into spend analysis clearly is a must. We note, too, that ERP solutions represent 76 percent of all data sources extracted for spend analysis systems and 38 percent of all integration functionalities used in spend analysis. As a result, there is a clear need for adopting processes and technologies that are certified on enterprise platforms for providing more seamless integration into spend analysis systems.

If spend data is not managed (i.e. extracted, cleansed, enriched), not only will savings opportunities be missed downstream in the procurement cycle, but also analysis on spend may not reflect the true picture of spend within an enterprise. This is particularly so if processes for extracting data from multiple sources are not resolved. Considering that data extraction is a key process goal, Best-in-Class organizations demonstrate that they are 21 percent more likely than all other organizations to collect spend data from multiple sources.

Increasing Spend Visibility

Another key process differentiator is the ability to achieve spend visibility. An example is the ability to get a quick snapshot view for reporting on the supplier, category or item level; across all maturity levels 50 percent of respondents reported having this capability. However, a clear difference among maturity levels was established in enterprise visibility of spend. For example, Best-in-Class organizations are 33 percent more likely to achieve visibility into enterprise-wide spend across all categories of goods and services. As a result, the Best-in-Class were 1.25 times more likely to achieve Level 3 visibility into their spend data and suppliers. This translates to a higher item-level visibility into purchases within a given category as well as the ability to aggregate category spend into smaller sub-categories according to a standardized system

of classification. (Level 1 visibility is considered to be supplier-level visibility while Level 2 refers to visibility at the category level.)

This advantage was also demonstrated in the ability to achieve drill-down visibility into suppliers, where the Best-in-Class were 21 percent more capable. However, the importance of spend visibility, of course, is in the ability to identify strategic sourcing opportunities and prioritize opportunities for savings within a spend category. Best-in-Class companies are 11 percent more likely to have this capability than all other organizations.

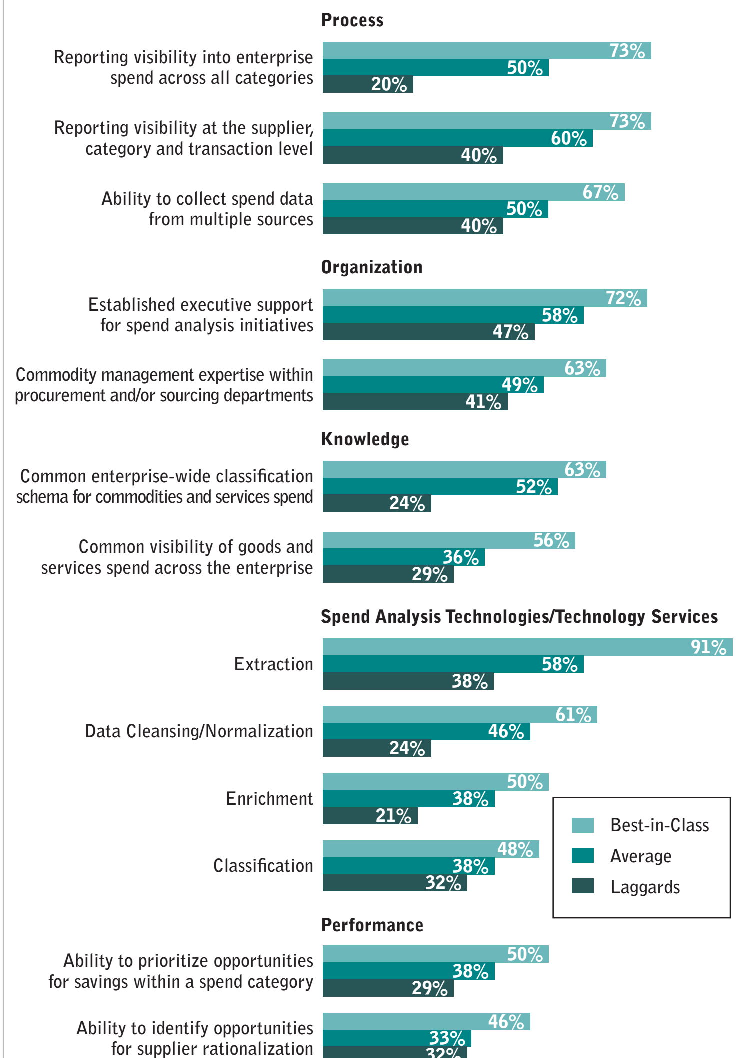
Organization: Executive Support and Building Expertise

Perhaps more than any other aspect of establishing effective spend analysis initiatives, it is organizational factors that dictate the perception of spend analysis' value for other business units. Much of the success of any program is getting buy-in from all the players connected to spend data (finance, treasury, supply chain, and so on) as well as from C-levels that would sponsor initiatives as part of a wider program. Based on the capability of creating a consensus for understanding the value of spend analysis, the Best-in-Class were 19 percent more likely to have established executive support for spend analysis initiatives than all other organizations.

Another critical aspect is the organizational focus on building the proper resources for creating expertise in the field. On this capability area, 32 percent of all respondents indicated they had insufficient skills (for example, lack of commodity knowledge, insufficient data analysis capabilities) necessary to execute a spend intelligence program. Overall, Best-in-Class organizations demonstrated a competitive advantage in this area. For example, 63 percent indicated having commodity expertise within sourcing or procurement departments, compared to 46 percent for all other organizations.

EXHIBIT 4

The Competitive Framework



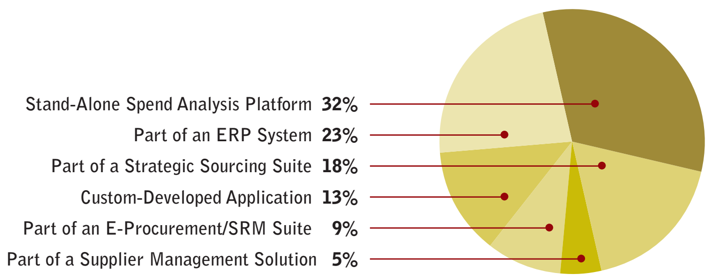
Source: Aberdeen Group, September 2011

Knowledge Management: Establishing Common Standards

Establishing visibility is a critical aspect to spend analysis. From a knowledge management standpoint, common spend visibility starts with creating common definitions of spend data and how they will be used for identifying opportunities. This begins with the creation of enterprise-wide classification schemas for products and services spend through commodity codes being leveraged within the organization, an activity more often found in the Best-in-Class companies.

EXHIBIT 5

Deployment of Spend Analysis



Source: Aberdeen Group, September 2011

From a knowledge management perspective, Best-in-Class organizations also demonstrate a higher usage of internally developed standards than other organizations—88 percent vs. 78 percent for all others. This underscores the need for coordination within the organization and among all spend data stakeholders to use a common language and common definitions. This is particularly important with higher custom use of taxonomies that relate to special business or organizational requirements. Common standards also assist in the ability to establish common visibility of goods and services spend across the enterprise, an advantage of the Best-in-Class over all other organizations (56 percent vs. 33 percent).

Technology Deployment: Approaches and Enablers

Perhaps more than other solution areas in spend management, spend analysis is almost exclusively dependent on technology for its use. How organizations are using existing technology investments for their spend analysis initiatives provides insights for those looking into the optimal way to deploy or implement a spend analysis platform. In this regard, Exhibit 5 shows that among those respondents with a spend analysis solution, most are using spend analysis on a stand-alone basis (32 percent), followed by usage from an ERP platform (23 percent), and usage as part of a sourcing suite (18 percent). Based on these structures of deployment, those using spend analysis typically already have e-procurement (53 percent), contract management (45 percent), e-sourcing (44 percent).

Looking overall at deployments, 68 percent of organizations indicated they are using on-premise or installed software vs. 32 percent using SaaS (software as a service). Moreover, looking at the top two means of deployment, for those leveraging their ERP systems the usage of on-premise spend analysis was much more predominant at 94 percent. In terms of those using a stand-alone system, the breakdown was much more even—52 percent for on-premise and 48 percent for SaaS. This is an indicator that existing investments in ERP for spend management have a strong influence in determining the approach or even platform of choice for spend analysis at this time.

In examining spend analysis as an application alone, we identified five key areas of functionality that can be identified where organizations have adopted technology. As shown in Exhibit 6, the Best-in-Class have a high deployment (91 percent) of data extraction components of spend analysis, a capability critical for eliminating discrepancies and duplicates. Best-in-Class organizations are 27 percent more likely than Laggards to be automatically extracting data and 30 percent less likely to have manual processes. However, the level of spend analysis deployment tapers off for all maturity classes for other spend analysis enablers such as spend visibility (53 percent among Best-in-Class), which is essential for customizable reporting/dashboards; data enrichment (50 percent), for additional or complimentary information on suppliers; and classification (48 percent), critical for mapping data elements and mapping spend data to industry standard classification systems.

Performance Management: Improving Visibility for Action

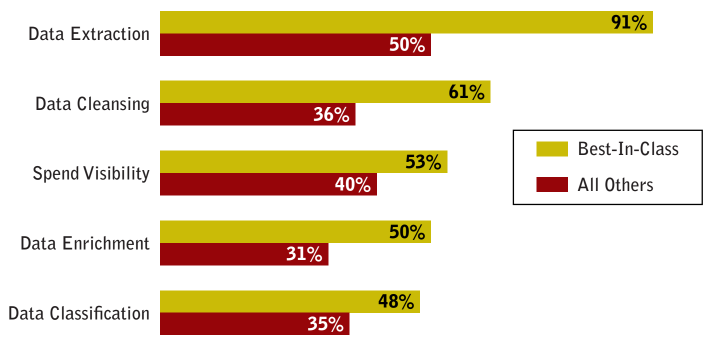
The overarching goal of spend analysis is to enhance visibility as a means for improving spend and supplier performance within a procurement organization.

One key performance management area that distinguished Best-in-Class organizations is the ability to prioritize opportunities for savings within a spend category (Best-in-Class 50 percent vs. 34 percent for all others). Prioritization within spend analysis is based on the ability to get insights through enhanced automation of spend visibility and reporting (that is, drill-down and multidimensional reporting). Sixty percent of Best-in-Class respondents possess this capability.

The second is the ability to identify opportunities for supplier rationalization (Best-in-Class 46 percent vs. 32 percent for all others), which ties in directly to capabilities in analyzing spend combined with understanding supplier performance and risk. In this regard, the Best-in-Class have a 44 percent higher capability to measure supplier business critically, or how important a supplier

EXHIBIT 6

Adoption of Spend Analysis Enablers



Source: Aberdeen Group, September 2011

is to a business. The Best-in-Class also have 42 percent higher capability in analyzing the overall strength and stability of a supplier's business.

Action Steps Required

Regardless of their current capability level—Laggard, Industry Average, or Best-in-Class—companies must strive to advance by continually looking for areas of spend analysis optimization and improvement. The action steps offered below can help companies at each level achieve that needed progress.

Laggard Steps to Success

• Increase automated integration of spend data with spend analytics. Improving this process will increase Laggards' ability to push spend data for spend analysis efforts, which currently stands at 50 percent for Laggards compared to the Industry Average of 59 percent.

• Improve the ability to enrich spend data. Laggards are 1.2 times less likely than Industry Average organizations to enrich their spend data. Spend analysis is increasingly becoming a transforming source of information for building not only insight into spend, but also intelligence around suppliers and the impact of that spend. This includes the ability to track supplier parentage via corporate hierarchies reports, which is in place at only 15 percent of Laggard companies.

• Establish enterprise-wide classification schemas. Establishing a "common language" is an integral part of creating linkages through commodity codes that influence everything from catalogs to purchase orders. Where only 24 percent of Laggards are capable of this currently, 56 percent plan to improve in this area in the next 12 months.

Industry Average Steps to Success

• Automate data collection from multiple sources. Given the number of spend data sources for spend analysis, establishing automation for extracting spend data becomes essential for efficiency and accuracy. Industry Average companies are 30 percent less likely than the Best-in-Class to have implemented technologies for integrating/extracting data into spend analysis.

• Develop the ability to cleanse and classify data. Another key facility of spend analysis is leveraging cleansed and classified data. This promotes the means to more easily identify opportunities beyond manual processes for increased category efficiency and the ability to identify duplicates such as payments or suppliers. In this regard, the Industry Average companies are 19 percent less likely than the Best-in-Class to have technology enablers in this area.

• Increase visibility at the supplier, category and transaction levels. Thirty-seven percent of Industry Average organizations reported some major barrier to their ability to identify and prioritize top spend categories. Organizations that understand the dynamic of spend at multiple levels are better able to identify spending trends and to distinguish preferred suppliers through capabilities such as power-user (i.e., users designated to designing and building custom reports/dashboards), drill-down, and multi-dimensional reporting. Thirty-seven percent of the Industry Average plan to implement or add spend visibility tools in the next 12 months.

Best-in-Class Steps to Success

• Improve understanding of supplier risk through spend analysis tools and dashboards. With only 17 percent of Best-in-Class organizations having this capability in place, it is imperative that organizations increase their investment in linking spend analysis and supplier management capabilities. In particular, improvements are needed for integrating and enhancing supplier data such as financial, corporate, and social responsibility-related information.

• Develop a cross-functional review of spend data for strategic planning. Only being executed in a third of Best-in-Class organizations, improving the voice of the procurement organization through cross-functional review of spend data is a key action, particularly for the CPO. By increasing involvement of spend analysis to groups outside of procurement, organizations are better prepared to make strategic decisions on their spend and enhance their ability to influence key stakeholders (such as the CFO).

• Increase the usage of third-party economic data. As a means for improving insights into how economic and world events impact existing data, the Best-in-Class need to improve their usage of third party economic data that includes commodity prices, inflationary data, exchange rates and market indices. On average less than a quarter of Best-in-Class organizations are integrating this type of data into their spend analysis systems.

A Holistic View

Spend analysis has come a long way over the past decade. Initially focused on transaction-oriented insights, best-practice spend analysis today is providing a more holistic view of spend through increased aggregation of spend data and automation. Every organization has a different start and end point with regard to technology; spend analysis is no different. In this regard, the goal of spend analysis is to understand how spend is being managed within an organization.

Therefore, increasing visibility into spend starts with standardizing formal spend intelligence (cleansing, categorization, enrichment) processes and methods across the organization, increasing automated integration of spend data from ERP systems and procurement-related systems, and improving user access and the ease of use for spend analysis tools.

For those more advanced in their spend analysis initiative, taking the next step involves increasing the integration of supplier data with spend data and considering how the emerging technique of predictive analytics can provide greater insights into how economic and natural events impact the performance and approaches to spend management.

Research Methodology

In September 2011, Aberdeen examined the use, the experiences, and the intentions of 132 enterprises using supplier management in a diverse group of industries and across multiple geographies. Aberdeen supplemented this online survey effort with interviews of select survey respondents, and by gathering additional information on strategies, experiences, and results. The ensuing research report was titled *Spend Analysis: The Nexus of Spend Management*.

For more on this report and on other resources from the Aberdeen Group visit www.aberdeen.com.

Our panel of experts examines what lies ahead for supply chain professionals. The consensus: Cost pressures, competitive challenges, and economic volatility will only intensify going forward. The keys to success in this environment are flexibility, a willingness and capacity to change, and an unwavering focus on the customer.

Global Trends Roundtable:

SCMR *Executive Editor Patrick J. Burnson served as moderator for the Global Trends Roundtable.*

What are the major developments that will impact supply chain professionals in the months and years ahead? What challenges will they face in helping their companies compete in an increasingly global environment? To help answer these questions, *Supply Chain Management Review* assembled a panel of prominent analysts, consultants, and industry practitioners. These experts explored a range of topics, including how rising fuel prices, risk management, global sourcing, and new regulatory compliance issues are reshaping the supply chain landscape.

SCMR will reconvene these panelists for a special web event scheduled for March 29, 2012. To register for this webcast, go to www.scmr.com/roundtable2012

Roundtable Panelists

David Joseph Aquino, CPIM: Vice President, Supply Chain Planning, Strategy and Performance Houghton Mifflin Harcourt, and formerly research director at AMR/ Gartner.

Simon Ellis: Practice Director, IDC Manufacturing Insights and author of IDC's "Supply Chain Top 10 Predictions for 2012."

Roddy Martin: Senior Vice President Global Supply Chain Competitive Capabilities International, Inc., and previously a senior analyst with AMR/ Gartner.

James B. Rice, Jr.: Director of the Integrated Supply Chain Management Program (ISCM) at MIT's Center for Transportation and Logistics.

WHAT'S ON THE SUPPLY CHAIN HORIZON

Supply Chain Management Review: *With regard to sourcing strategies, are there any emerging markets that are lurking beneath the radar these days, or will supply chain managers continue to target the "usual suspects"?*

Simon Ellis: I think it is still the usual suspects, mainly, although we are seeing, for example, growing interest in Mexico and the Caribbean as a source of low cost manufacturing for U.S. demand.

David Joseph Aquino: Since the global recession began, organizations that viewed international markets as "icing" to a heavy base in either North America or Europe, have radically changed their strategies to avoid catastrophic results. Clearly there has been an emphasis—possibly too scattershot—on finding any way to build market share and generate geographic diversity.

Roddy Martin: That's true, and Latin America is quickly emerging as an important market opportunity in that regard. Lead time issues in the Asia Pacific are also making South America more attractive. Africa is also starting to emerge, particularly in the south where there is a more sophisticated infrastructure.

James Rice: I hear and see more about Vietnam and Central America as emerging sources of production supply. Also, a few are talking about and working on Africa as sources of production supply—mainly pharma.

SCMR: *Given the political volatility in the Middle East, will fuel costs remain an issue going forward? How do shippers protect themselves from sudden spikes in prices?*

Rice: Fuel costs will continue to be an issue for a long time. They will go up and down. I don't think that there are genuinely any new approaches to this, although the more advanced supply chain managers may use options to hedge and balance risks.

Aquino: I agree. To manage fuel volatility, organizations should at minimum carefully monitor and review pricing contracts and make a coordinated effort with their transportation partners to evaluate potential risks. Additionally, if there are clear opportunities to build in dynamic shipping pricing for end-customer transactions for final shipment, this can ensure that as pricing volatility crops up you are not behind in being able to address a portion of the costs. Amazingly, the connection of pricing changes in many organizations lags too far behind fuel surcharges and resets of budgets. This is in part because of a lack of awareness, poor data management, and an absolute unwillingness to address customers about the impacts.

Martin: That's right, David. The key for any business today is a solid understanding and segmentation of global market demand at a detailed level. Leaders are executing "demand-back" designs of both the demand network and the supply network on a global basis and then planning some aspects of global demand fulfillment from central core planning capabilities. This is the answer to agility and adaptability. And yes, the capability to operate in this way will help companies make the balanced tradeoffs to minimize the costs of fuel and the risks of instability.

Ellis: It looks like we are all on the same page here. I'm afraid fuel costs will always be an issue. And while Middle East instability is not helping, fundamentally it is growing global demand that is at the heart of rising costs. That is not changing anytime soon. The good news for the U.S. is that natural gas reserves can act as a buffer to fuel costs for some parts of the manufacturing marketplace. Shippers need to build rising costs into their strategic plans and ensure that they are looking at ways to mitigate these costs, such as using intermodal or maximizing full-truck use.

Businesses must be agile in their decision making and have the capability to deal with multi mode scenarios, not one or the other.

—Roddy Martin

SCMR: *Near-shoring or a hybrid sourcing strategy seems to be one solution to volatile fuel prices. But how realistic are these tactics?*

Ellis: Well, it depends. For businesses that are not locked into large PP&E (property, plant, and equipment) investments or contracts, the use of near-shoring is absolutely an option. There may be some kind of initial capability ramp-up, but if the net landed costs favors closer supply then it can be done.

Aquino: Regardless of the economic cycle, advanced network modeling that considers product lifecycle, operating constraints, forecasting capabilities, total costs, and impact of a lack of availability should be applied. This helps in determining the ideal operating practices. The gross decisions—especially in the apparel industry—to attempt to eliminate local and/or near shore manufacturing without sensitivity or network analysis in specific cases has created unintended consequences. There's been longer lead-times, overall higher average inventory investment, increased obsolescence risk, exponentially increased complexity, and a lack of situational awareness with respect to quality and supplier performance. What I'm really saying here is that advanced supply chain organizations that are more "nuanced" have more success. For example, being able to have base load produced off shore with reserved capacity locally for incremental opportunities or issues has been a solid approach.

Rice: The good news about near-shoring and hybrid sourcing it that it will likely be coupled with actual analytics that may include total cost rather than just procurement cost—which was the lure in going to China for many. Let's hope that is the case for most of those considering using these approaches. Done properly, this will be something that companies will take time to analyze and also unwind some of their other commitments in other parts of the world. It won't happen overnight for mass volumes.

Martin: We must realize that the answer does not only involve near-shoring and/or hybrid sourcing as a single solution or option. It depends on what the business is trying to achieve and what the demand characteristics are that drive near-shoring or hybrid sourcing decisions. There isn't a single "canned" solution that fits all scenarios. For example, a footwear manufacturer making school shoes with predictable demand and cycles could outsource them to China with its long associated lead times. But the same manufacturer making footwear for fashion wear in the summer in the U.S. cannot tolerate long lead times and must be more responsive. This supply chain manager may choose to use manufacturing capacity in Latin America. The takeaway is that businesses must be agile in their decision making and have the capability to deal with multi mode scenarios, not one or the other. The key is that these decisions are driven by what the business is trying to achieve and the demand characteristics of the market.

SCMR: *Turning to the much-anticipated Panama Canal expansion to be completed in 2014, are supply chain managers considering vessel redeployment strategies? The great unknown here seems to be what gate rates the Panama Canal Authority will charge.*

Rice: I'm not aware of supply chain managers investing a lot of time or money in vessel redeployment. There are surely companies making infrastructure investments, but we won't really know the impact until we get a little closer and until the pricing for the various options becomes clearer. The cost for land-bridge (rail and truck) may vary in response to the pricing by the Authority.

The Risk Factor

Rose Kelly-Falls: Senior V.P. Supply Chain Risk Management for Rapid Ratings, an independent ratings, research, and analytics firm.

Bringing an expert risk management perspective to our roundtable is Rose Kelly-Falls, Senior V.P., Supply Chain Risk Management for Rapid Ratings. Prior to joining Rapid Ratings, Kelly-Falls was head of Financial Risk-Supply Chain Management at Rolls Royce North America.

SCMR: How should a supply chain transformation strategy incorporate the element of risk and the ability to respond to unanticipated changes?

Kelly-Falls: The strategy, or vision, has to include scenarios assessing how the business may evolve in the future based on inevitable and unforeseen changing business conditions. There is no "right decision," but the strategy in place needs to be nimble enough to account for the changes that will undoubtedly occur. In the past, many companies were so intolerant of change that they lost focus. Those that were willing to engage in transformation became the leaders. A recent example of this is Ford Motor Company. They were able to fall down, but were well-prepared to get right back up and try again. And they've been very successful.

SCMR: How can companies implement and harmonize technology in their risk management initiatives?

Kelly-Falls: Choosing and properly integrating the right tools and technology for your risk management initiative is critical because there will never be a one-size-fits-all system for managing risk. Most technologies are web-based and can be mapped to a system or dashboard that pulls together the necessary information from various resources for ease of use and reference. With the technological capabilities that exist today, implementation should be relatively straightforward, and most ERP systems allow customization to include outside information. Many expect this to be difficult or costly. But, in fact, a great deal of time and money can be saved by mapping information to a system directly.

SCMR: Are companies paying sufficient attention to the financial stability of their suppliers as a key indicator of risk?

Kelly-Falls: Most companies review some of the financial information from their suppliers. The question is how frequently they revisit the financial status. Firms should take a systematic approach to reviewing that information, doing so quarterly, biannually, or annually. Unfortunately, most companies fear that such an approach would consume excessive time and resources. The result: they review supplier financials only when awarding new business or when they hear rumors about a supplier in trouble—by which time it's often too late. In order to use supplier financial viability as an effective indicator, companies need to take advantage of tools that offer a systematic approach. These allow companies to assess financial risk by looking through the windshield rather than the rear-view mirror, to see important risk indicators clearly.

SCMR: How can companies assess and manage risk posed by private companies?

Kelly-Falls: Establishing a relationship and collaboration with private suppliers is essential for building trust so that the private companies are comfortable enough to share critical financial information that can be used to assess risk. Further, an open, honest dialogue with suppliers about how their information will be used, what the process is for assessing their financials, and what may be done if the assessment outcome falls below expectations is particularly important. The key here is relationship management; working with private companies boils down to cooperation stemming from mutual respect and collaborative engagement.

Martin: Once again there is no single, one-size-fits-all answer for this question. The answers may even change across a year based on market forces and scenarios. Today's expansion goals will be countered by some other infrastructure development or tax incentive in another country; these decisions are not static and never will be. Logistics and transportation decisions are strategically part of supply chain network decisions and cannot be made as a separate silo based on costs or on today's situation. The business must make these decisions in the context of risk, responsiveness to demand, and profitability.

SCMR: *So to be clear, Roddy, you are saying that all the layers of complexity with this issue have yet to be revealed?*

Martin: That's it exactly! At a recent panel I chaired that included representatives of the Panama Canal and the U.S. port and rail authorities, they pointed to the fact that the goals are moving all the time. Therefore, it is imperative that manufacturers, shippers, and distributors build the capabilities, organizations, and models to continue to model, map, and optimize the network. That way, they can make quick, agile choices based on opportunities that may evolve or risks that may need to be dealt with. Deployed vessels and gate rates must be seen in the context of the end-to-end value network system and not in departmental silo performance.

Organizations should start embracing scenario planning for possible futures, then build options to handle those various futures rather than trying to predict.

—James B. Rice, Jr.

SCMR: *Global regulatory compliance is always a concern. Are there new rules or changes in existing laws that our readers should be aware of?*

Rice: With regard to security, the new mutual recognition between US C-TPAT (Customs-Trade partnership Against Terrorism) and the EU AEO (Authorized Economic Operator) may open up some different trade flows or possibly expedited trade flows. There are a few other initiatives that may also affect some trade flows.

Martin: Global compliance and changes to regulatory requirements will always be a fact of life and largely unpredictable on a global level. Unfortunately, too many manufacturers have reactively dealt with compliance issues and landed up with static compliance solutions that are inflexible and have to be continually repurposed and refocused as regulations change. Also, the focus is on regulatory compliance integration rather than embedding those capabilities as part of operating processes. Changes should be made at a practice level. The approach to regulatory compliance should be rather to build sustainable performance improvement capabilities that are systemically deployed as part of practices and process capabilities—and as not a reactive "stick on."

SCMR: *So, your answer is that manufacturers should build process capabilities that are adaptable to new regulatory requirements that may be introduced?*

Martin: Yes. In that way performance improvement is also a criterion in deployment. This includes environmental and product safety issues.

SCMR: *The impact of ongoing "slow steaming" and port congestion is causing shippers to examine landed costs in a new light. Can you share any insight on this issue?*

Rice: I think that this, along with fuel prices, warrants looking at scenario planning rather than forecasting. That is to say, organizations should start embracing scenario planning for possible futures, then build options to handle those various futures rather than trying to predict.

Ellis: That's right. It's no different than any other cost. It is incumbent upon shippers to ensure that they are factoring as many cost elements as possible into their assessment of net landed cost to ensure that they are making the correct decisions around sourcing strategies.

Martin: The key and only meaningful way at looking at costs is total "end-to-end cost-to-serve," rather than a silo component of cost. What I'm talking about is the cost end-to-end from supply through logistics and distribution right to the shelf. Then a company can look at the components and benchmark them. Based on demand, there will be a window of costs that are unacceptable and therefore alternatives need to be sought, but only when one looks at the components as part of the whole and its profitability.

If the issue of landed costs is being impacted by component transport strategies, then it must be seen in the context of the full end-to-end costs and addressed in more detail. Even once the components are identified as part of the whole, one can look at strategies to minimize their impact. U.S. ports and railways, for example, are building strategies and capabilities to minimize the impact of these issues.

SCMR: *In a broader sense, managers are examining supply chain transformation strategies. What are some key components of a successful transformation strategy?*

Ellis: First and foremost, it is about supply chain modernization—finding ways to balance supply complexity with demand volatility. The tactics that worked even five years ago probably don't work today. So supply chain managers are looking at where to outsource/insource, where to deploy technology. They must learn to leverage "big data"—datasets that grow so large that they become awkward to work with using on-hand database management tools—and how to make their supply chains faster.

Aquino: Well-designed transformation strategies are based upon being able to methodically and comprehensively understand the end consumer objectives and needs. Supply chain managers must then design specific supply chain approaches back from that. Strong sup-

ply chain segmentation that allows for common drivers and needed capabilities allows for an evaluation of current performance against competitors and best-in-class supply chains as well. Once the segments, consumer requirements, and gaps in performance are understood, development of a transformational approach becomes clearer. Too many supply chain organizations have really little idea what makes their customer happy. The educational process and enlightenment of clear segmentation and a rigorous effort to understand consumer needs drives all subsequent elements of the transformation.

Rice: Again, scenario planning will win the day. Rather than organizations attempting to make the right prediction, they ought to identify possible futures and then prepare for each with various hedging, real options, and design choices. The future will be won by those who can prepare for various possibilities and then have the resilience to execute. This is real sustainability—the ability to handle the vagaries of global trade so as to keep the organization in operation and create economic success.

SCMR: *How do these challenges we've been discussing impact supply chain leadership and organization. What do you see as the "next big thing" here?*

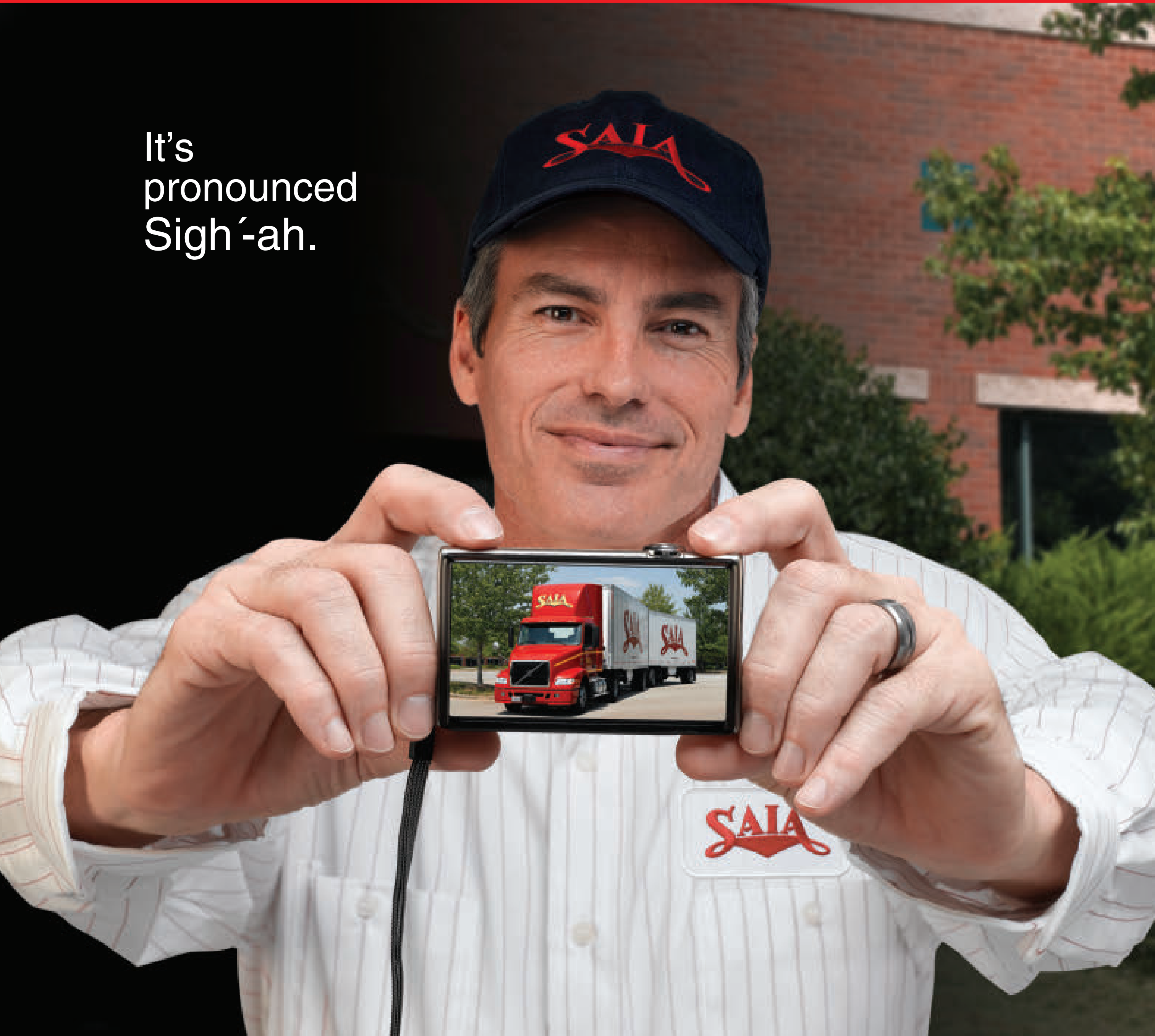
Ellis: I think there are plenty of manufacturing companies that do not have a chief supply chain officer, or at least anyone representing supply chain at the board level, so perhaps that is a good place to start. Beyond that, I have been advocating for years now that the essential supply chain skill set has been slowly moving from "make" to "source." That means that negotiation skills are becoming more important than factory skills. This is not true in all manufacturing sub-segments, but as outsourcing continues to grow, effectively managing suppliers is critical.

Aquino: It has been clear through my prior research (while at AMR Research/Gartner), which focused on supply chain talent and organizational design, that modern supply chains and their leadership have been gaining quite a bit of traction in building structures that support broad-based integrated models. This means moving from very traditional functional areas to interdependent broad based responsibility. This, in turn, is manifesting itself in the Chief Supply Chain Officer roles, which includes responsibility for the development and evolution of supply chains now defined as "digital," or "virtual." Whether in media, publishing, consumer electronics, or pharmaceutical, the effective management of these assets as it relates to product development, sales life cycle management, reporting, or financial activities is a primary focus. Organizations that have struggled to manage a traditional physical supply chain will be destroyed with an ineffective or unmanaged digital supply chain.

Ellis: But in the end, communication is key. The role of social networking and other media relationships is growing in importance when it comes to relating supply chain advantages. As supply chain organizations rediscover the need for differentiation, they must also determine what their supply chain really stands for.

Well-designed transformation strategies are based upon being able to methodically and comprehensively understand the end consumer objectives and needs.

—David Aquino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9th Annual Global Supply Chain Survey

Leaders Making the Most of Visibility, Flexibility, and Analytics

This year's survey focused on the progress being made across three capabilities that are essential to supply chain success today —visibility, analytics, and flexibility. As in past surveys, clear levels of competency emerged among the respondents. We've termed them the leaders, followers, and laggards. And it's not surprising that the leaders' superior performance in these key areas translates directly to competitive advantage.

By Morgan L. Swink, Ronald R. Johnson, and Francis J. Quinn

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Supply chain managers are key contributors to stabilizing the abrupt economic changes. They do this by aggressively managing costs and crafting a flexible supply chain to retain market share through increasing customer service. In this year's Global Survey of Supply Chain Progress[1] we see a continuing role of supply chain managers as the economy rebounds. This ninth annual survey explored three factors that we believe will be critical to companies' abilities to capitalize on growth opportunities: these factors are visibility, analytics, and flexibility. (For more details on this year's survey, see the accompanying sidebar at the end of the article.)

The survey results do indeed show that supply chain leaders are building systems and developing partnerships that give them greater depth of visibility into a wider set of factors. Equally important, however, these leaders know what to do

with the vast amounts of information that their visibility systems provide. First, they possess the analytical capabilities to make sense of the information. Second, they possess the flexibility needed to respond to new needs and opportunities uncovered by their analytical tools. Combining these areas of expertise creates a formidable and responsive supply chain. Our data show that firms who are taking these initiatives are outperforming their rivals in many dimensions, including both growth and profit.

Growth on the Horizon?

Several indicators suggest that supply chain performance patterns are improving. Each year we ask the respondents to give us a sense of the success of their supply chain initiatives. Supply chain is becoming a growth engine by managing costs and serving customers' growing demands for flexibility. The three-year average of supply chain's contribution to revenue increased from 4.0 percent last year to 8.5 percent this year. Similar gains were recorded in cost management, a supply chain cornerstone in a competitive market position. This year, supply chain's impact on cost reduction moved up from 6.0 percent to 6.9 percent in a rebounding economy. (Exhibit 1 shows the impact of supply chain initiatives on revenues and costs.)

We make comparisons each year across what we term leaders, followers, and laggards. Leaders are respondents

EXHIBIT 1

Impact on Revenue and Costs

What has been the impact if your supply chain initiatives on:

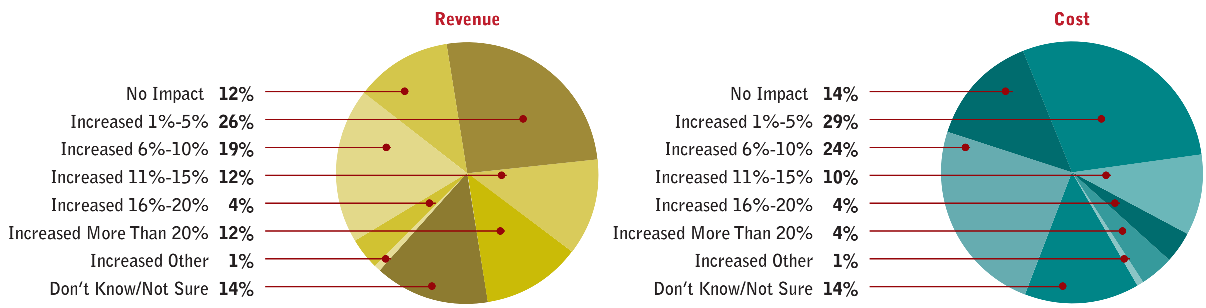
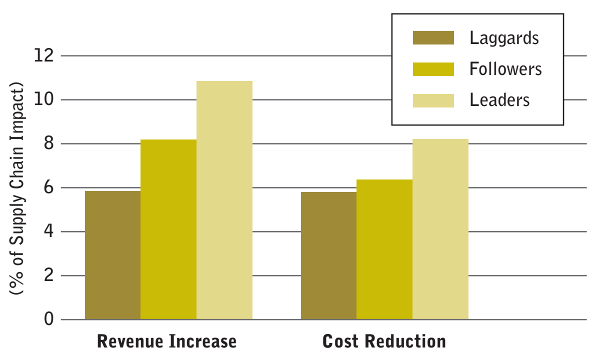


EXHIBIT 2

Leaders Outperform on Revenue Increase and Cost Reduction



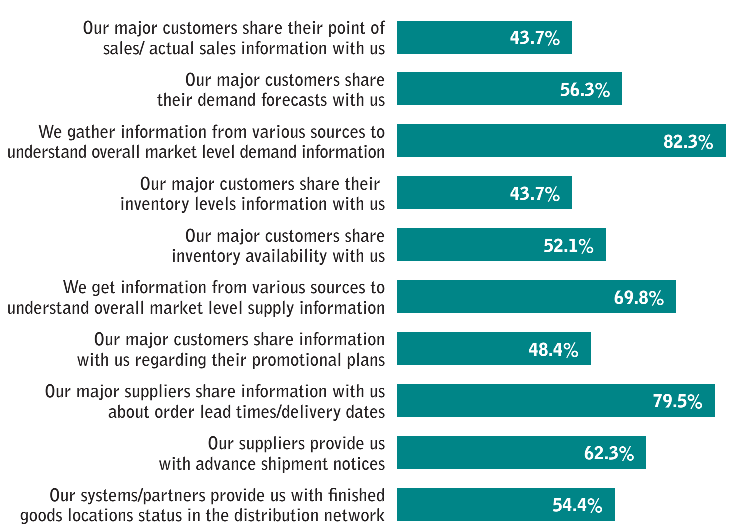
who consider their overall supply chain competencies to be above average for their industry; followers represent the industry average; and laggards rate themselves below average.

Leaders elevate the supply chain through organizational structure. They are 1.5 times more likely to promote supply chain leadership to a "C" level and twice as likely to position the leading supply chain manager as a direct report to a corporate officer (EVP, CSCO, COO).

In past years, we have established that leaders tend to have broader and more global views of supply chain management, and they are typically early adopters of new technologies and planning systems. Importantly, supply chain leaders influence revenue gain at double the rate of laggards. Likewise, the leaders' supply chain initiatives produce cost reduction of 8.0 percent in comparison to the 6.0 percent produced by laggards and followers, as shown in Exhibit 2.

EXHIBIT 3

"Yes" Responses on Dimensions of Visibility



The Visibility Advantage

How do we explain the performance of the leaders relative to the others? Supply chain visibility—which is central to both revenue growth and cost management—is one key. We asked respondents to tell us about the range and quality of their visibility for 10 different dimensions of visibility, which extend both upstream and downstream. Among the factors included were access to data describing customer demands and promotional plans, as well as supplier inventories, deliveries, and the like. (Exhibit 3 shows the complete list.)

Seventy percent of our respondents overall have visibility of upstream information. Not surprisingly, downstream visibility is not

EXHIBIT 4

Downstream and Upstream Visibility by Business Sector

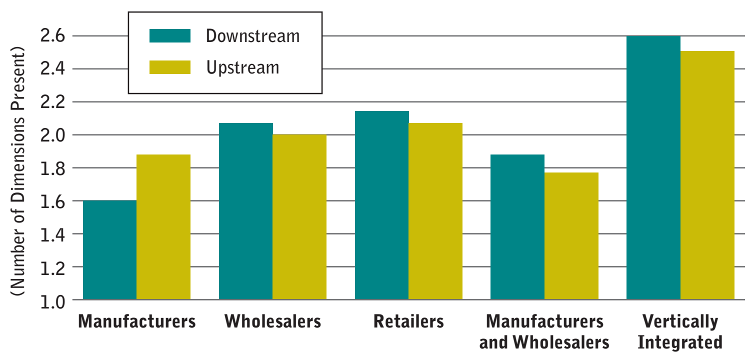
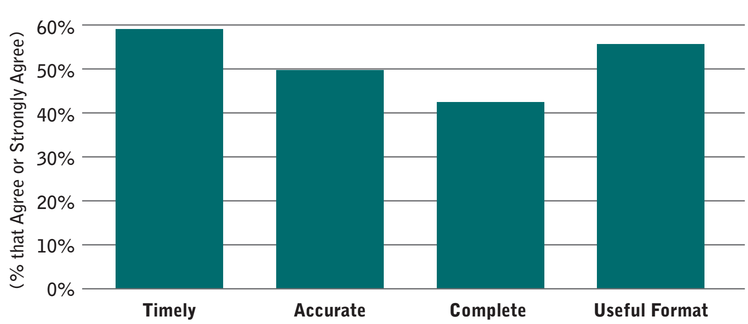


EXHIBIT 5

Quality of Information from Visibility

The information we receive is:



as pervasive. The potential for improving downstream visibility, however, is great. Key benefit areas center on improved S&OP and advanced planning processes.

Our survey harvested responses from around the globe, including pure manufacturers, wholesalers, retailers, and more vertically integrated firms. Interestingly, the vertically integrated firms reported significantly greater breadth of upstream and downstream visibility than the other firms. (Exhibit 4 shows the downstream and upstream visibility dimensions present in each of the sector respondents).

Our data suggest that integration allows greater access to and control of information. This finding harkens back to classic examples of excellent design and manufacturing firms that have benefited from owning retail operations (e.g., Dell through direct sales, Zara owning their retail stores). Ownership overcomes the barrier to data sharing through "network" optimization. Planners who work for the same company as sales personnel are likely to obtain faster access to data—and the data typically are presented in the more useful ways. Similarly, upstream integration provides quicker access and greater control over supply data.

Visibility is clearly a distinctive characteristic of the leading supply chain firms. Leaders have greater total visibility across all 10 dimensions as well as superior visibility to upstream and downstream information overall. The differences in visibility between followers and laggards are not significant.

In addition to breadth of visibility, the quality of the information that firms receive seems to vary considerably. We asked about information quality received from their visibility systems in terms of timeliness, accuracy, completeness, and usability. Not surprisingly, managers gave the "completeness" of the data their lowest scores. Fewer managers either agreed or strongly agreed that their visibility data were as complete as they needed to be. While they seem to be a bit more satisfied with data timeliness, accuracy, and format, the overall average scores indicates that their enthusiasm regarding the quality of data they get is fairly mild. (See Exhibit 5.)

Our survey suggests that companies with wider scopes of visibility and higher quality data are outperforming their industry rivals. There are two important complementary capabilities that help these firms capitalize on the visibility that their systems provide.

Analytics Capability a Core Asset

We asked our responding managers to indicate the degree to which their firms employed different analytical systems and processes such as simulation, optimization, and regression These analytics are enabled by the following: data decomposition, integration, and communication processes; data visualization techniques (dashboards, for example); and automated sensing, planning and decision systems. We constructed an overall analytics capability score from the responses, with 30 points being the maximum score. As expected, the levels of

capability varied considerably across firms in our sample. Manufacturing firms reported about the same levels of analytics capabilities as did services, with some variance across sectors. (Exhibit 6 shows the analytics scores across the manufacturing and service industries.)

With the average analytics capability scores hovering around 17 out of the maximum possible score of 30, the survey results suggest that there is still much room to further employ analytical tools and techniques. The data further indicate that analytics capability is a key differentiator of leaders from followers, and followers from laggards. For example, leaders are twice as likely as laggards to be experienced users of data analytics software.

Investments in analytics capabilities look to be well justified. Our data show that experienced users of analytics tools and processes extract more useful information from their visibility data. Our survey included 18 operational performance measures in seven major areas: service, cost, quality, asset productivity, profit, growth, and innovation. Across the board, visibility in combination with analytics capability creates useful information. For example, consider business growth, a composite measure of sales growth, market expansion, and market share. Firms in the top 20 percent of their industry in terms of growth also reported above average levels of visibility and analytics. Conversely, firms with below average visibility and analytics are growing significantly slower. Without the combination of data and data analysis capability firms fall somewhere in-between. (Exhibit 7 shows the range of business growth for the different levels of visibility and analytics capability.)

Our conclusion: a firm with combined visibility and analytics capabilities is almost twice as likely to be a fast grower (top 20 percent of growth) than a firm that is below average in both skill areas.

Flexibility Completes Needed Skill Set

Flexibility was the third area that our survey examined. While visibility and analytics produce vital information to drive efficiency and target growth, flexibility then gives us the ability to act upon that information. Flexibility means being able to act quickly

EXHIBIT 6

Analytics Capability Score: Manufacturing and Services Industries

(Maximum Score Possible = 30)

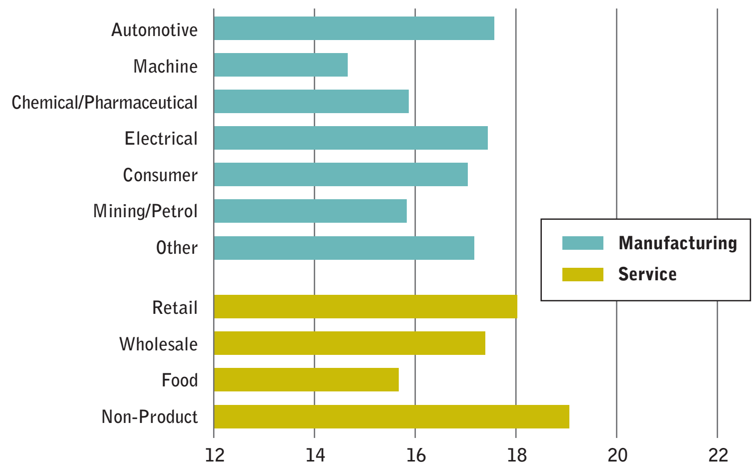


EXHIBIT 7

Business Growth by Visibility/Analytics Capability

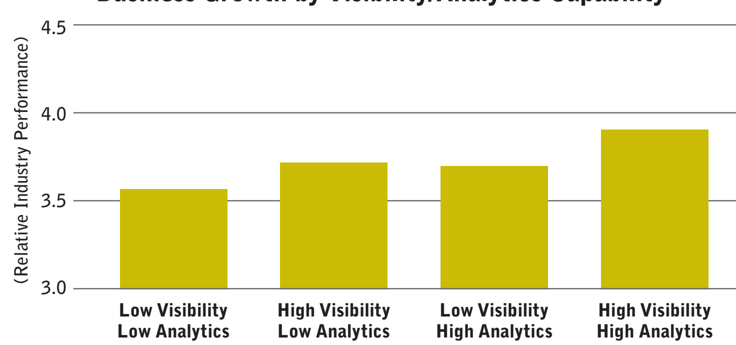
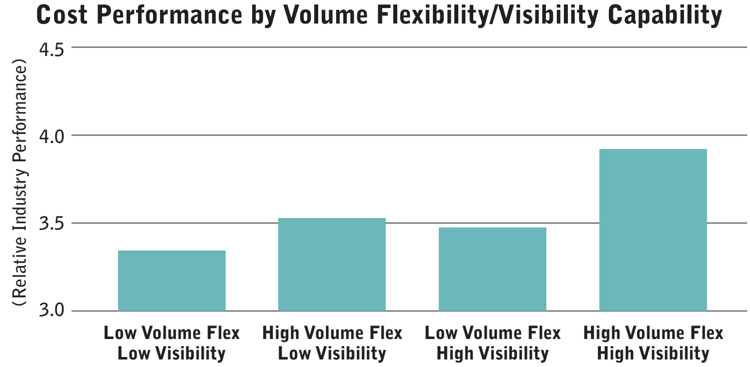


EXHIBIT 8

Cost Performance by Volume Flexibility/Visibility Capability



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Keynote Speakers

Donald Wirth
DuPont | Vice President, Global Operations—Corporate Supply Chain

Insights from Deployment and Sustainability

Dr. Steven A. Melnyk
Michigan State University | Professor of Operations and Supply Chain Management

Making Supply Chain Management Truly Strategic: A Blueprint for Action

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EXHIBIT 9

Service Performance by Variety Flexibility/Visibility Capability

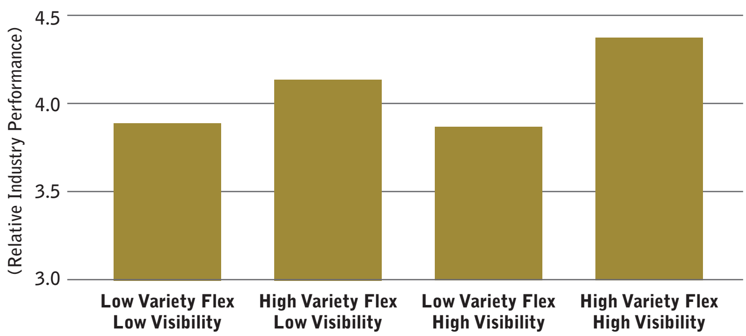
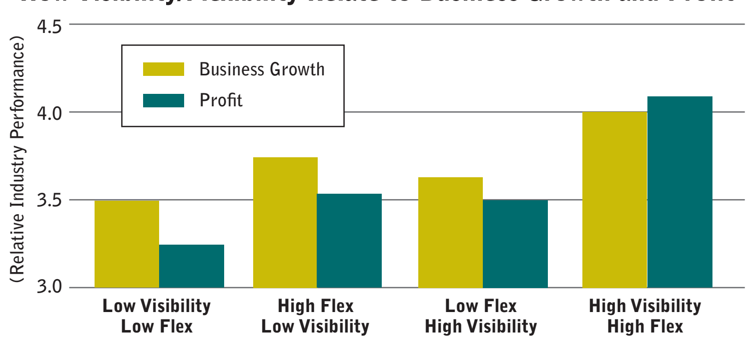


EXHIBIT 10

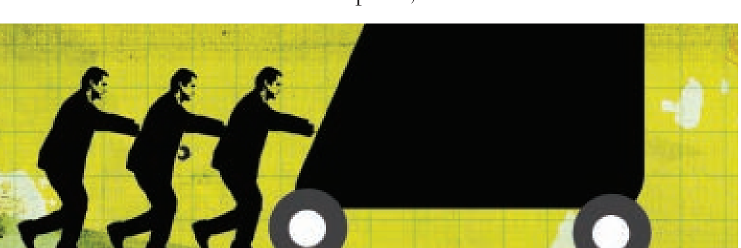
How Visibility/Flexibility Relate to Business Growth and Profit



and efficiently reorient or significantly change your products, processes, and organizations. Flexible supply chains change their operations quickly to respond to new opportunities or threats in the marketplace. Flexibility enables lower inventory, higher customer service, and timely response to market trends.

We explored flexibility in the following five areas: product volume (scalability); product variety (product range capability); new products (introduction speed and cost); product/service customization (tailoring to specific customer needs); and organizational change (adapting structure). The survey results suggest that each type of flexibility can be an important asset, depending on a firm's strategy and the operating environment.

To illustrate the point, consider the role of volume flexibility in helping keep costs competitive. The data shown in Exhibit 8 illustrates that volume flexibility produces cost benefits, even when there is low visibility into market changes. The most powerful combination comes when a firm has both high supply chain visibility with customers and suppliers and supply chain flexibility. This combination leads to an optimized capability that enables the firm's supply chain to accommodate changing internal and external needs, leading to a healthier business.



Similarly, the data indicate that product variety flexibility is important to achieving higher levels of service. This is the ability to shift production and deliveries quickly from one product type to another across a wide range of projects. The synergistic effect of visibility in combination with variety flexibility is depicted in Exhibit 9.

As expected, the leaders in our sample indicated that they had higher levels of flexibility overall. In addition, there were differences among leaders, followers, and laggards across each particular flexibility dimension. In all cases the leaders and followers indicated significantly higher levels of flexibility than laggards. Yet leaders were distinct from followers only in two dimensions: product customization and organizational flexibility, which appear to be the leading edge areas of improvement potential. A majority of the supply chain managers reported that they have already made strides in areas of volume, variety, and new product flexibility.

It is important for managers to consider how the different types of flexibility relate to one another—and how they can be developed, synergistically, with the different sources of visibility. Our results strongly suggest that firms should optimize flexibilities in accordance with the data from their visibility systems. For example, if a firm is particularly strong in customer-facing visibility regarding product demands and promotional plans, then volume flexibility is a likely target for improvement.

The data strongly indicate that the combination of visibility and flexibility enables the greatest business growth and profitability, as Exhibit 10 shows.

Get Yourself Ready for Success

Things seem to be picking up. Stronger firms continue to take market share from weaker ones, driving their growth and profitability.

The goal of a responsive, flexible supply chain has been the Holy Grail of supply chain managers for a long while now. In this year's Global Survey of Supply Chain Progress, we observe more focus on visibility and analytics that create the foundational capability to anticipate and then respond to change. This begins the transition that yields growth in market share and profitability. To be a leader, or to become one, consider what investments might be right for you.

Details on the Survey

The 215 respondents to this year's survey were split evenly between manufacturing and service organizations. The replies represented every major geographical segment in the world, the principal ones being North America, Europe, and Asia/Pacific.

Twenty industries were represented in this year's survey, 11 primarily manufacturing firms and 9 primarily service (e.g., financial, food, logistics, and so on). The respondents included both large and mid-sized companies, with sales in a range from $250 million to well over $1 billion. The number of employees varied from less than 250 to over 30,000.

The respondents completed a comprehensive survey questionnaire designed to gauge their present competencies in areas of supply chain visibility, use of supply chain analytics, multiple types of flexibility, and performance. There are general comments throughout the report relating to the differences between "leading" firms and others in the sample. The "leaders" are those that indicated their overall supply chain competence to be above the average for competitors in their respective industries.

End Notes

1 The Global Survey of Supply Chain Progress is a joint effort involving CSC's Global Business Services National Supply Chain, the Neeley School of Business at TCU, *Supply Chain Management Review.* We wish to thank CSCMP for their assistance in distributing this year's survey.

Embracing Green in China...

With an NGO Nudge

By Hau Lee, Erica Plambeck, and Pamela Yatsko

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To date, more than 200 corporate giants have explained to the seven-person Institute of Public & Environmental Affairs—a Non-Governmental Organization, or NGO—why their manufacturing facilities or suppliers in China violated the country's air and water laws. At least 50 companies have taken corrective actions and agreed to IPE-supervised environmental audits of their factories. Here's why supply chain managers need to pay attention to influential little watchdogs like IPE.

Apple. Motorola. Pepsi. HP. Timberland. Walmart. These are among the thousands of global corporations that a small Beijing-based nonprofit organization has exposed as sourcing from polluting factories in China over the last six years.

The nonprofit—the Institute of Public & Environmental Affairs (IPE)—has surprising clout. To date, more than 200 corporate giants have explained to IPE officials why their manufacturing facilities or suppliers in China were in violation of the country's air and water laws. To get off IPE's "blacklist," at least 50 companies have taken corrective actions and agreed to IPE-supervised environmental audits of their factories. A growing number of those companies are now using IPE's Web site as a tool to screen and monitor their Chinese suppliers' environmental performance.[1]

That's not bad for a homegrown seven-man operation working out of a modest office in a converted sixth-floor Beijing apartment. By taking advantage of greater environmental transparency in China and global corporations' desire to protect their reputations, IPE has become one of the country's leading environmental watchdogs, powerful enough to spur some multinationals to pay more attention to

Claire Fraser

their Chinese suppliers' environmental records and to lean on offending suppliers to fix problems.

Not surprisingly, some companies see the little NGO (non-governmental organization) as a nuisance, ignoring its notifications of suppliers' environmental infractions for as long as possible. Apple, for instance, paid no heed to IPE's entreaties for months until embarrassing headlines, such as "Apple Attacked over Pollution in China," in August 2011, scandalized newswires.[2] But far-sighted companies such as Walmart and Nike are embracing IPE as a partner in improving their environmental management of their Chinese supply chains. "The IPE Web site provides a really good platform for us to reduce the risk of environmental violations," says May Qiu, Nike's health, safety, and environment manager for Asia.

With so much sourcing from China—Walmart has more than 50,000 suppliers there—supply chain managers often need all the help they can get keeping tabs on suppliers' environmental records. This not only includes their direct suppliers, but also their suppliers' suppliers, which are increasingly coming under fire from environmental activists. Multinationals may even need to monitor certain factories with which they have no supply relationship at all—or risk guilt by indirect association. For instance, in July 2011, Greenpeace International targeted Adidas and Nike among other international brands for hazardous chemical discharges most likely caused by fabric factories that did not actually supply the two companies. The connection? The Chinese textile group that owned the offending factories also owned the sportswear companies' finished garment suppliers.[3]

China's New Environmental Transparency

A decade ago, IPE would not have been able to obtain and publicize information on companies' environmental violations in China as it can now. Chinese authorities traditionally guarded environmental information very closely. However, in the early 2000s, the central government established the public's right to know about factory pollution and local environmental conditions.

EXHIBIT 1

Selected Environmental Laws in China

1979	Environmental Protection Law
1984	Law on Prevention and Control of Water Pollution
1986	Law on Land Administration
1988	Water Law
1995	Law on Prevention and Control of Environmental Pollution by Solid Waste
1995	Law on Prevention and Control of Air Pollution
1996	Law on Prevention and Control of Pollution from Environmental Noise
1996	Law on Coal Industry
1997	Law on Energy Conservation
1997	Construction Law
1998	Law on Promotion of Cleaner Production
2001	Law on Prevention and Control of Desertification
2002	Law on Environmental Impact Assessment
2003	Law on Radioactive Pollution Prevention and Control
2005	Law on Renewable Energy
2006	Regulation on Enhancing Public Participation in Environmental Assessment
2007	Measures on Open Environmental Information (for Trial Implementation)
2009	Food Safety Law
2010	Regulation on the Administration of Ozone Depleting Substances
2010	Water and Soil Conservation Law of the People's Republic of China
2011	Measures for Information Report of Environmental Emergencies

Source: Information adapted from Ecolex, Ecolex website, http://www.ecolex.org. "The Xiamen PX Project: The Rule of Contract or Citizens in China Today," HBS No. 9-808-123, Rev. April 7, 2008, p. 16 and from Organization for Economic Cooperation and Development, Environmental Performance Reviews, China, 2007.

For instance, the Cleaner Production Promotion Law, effective in 2003, called for public participation and required relevant government departments to name polluting enterprises in the media. The environment ministry, in 2008, began requiring environmental agencies to disclose information on enterprises violating discharge standards, pollution complaints filed against companies, and administrative and enforcement actions against polluters. (Exhibit 1 lists the laws enacted since 1979.)

During the same period, the central government began to allow "orderly" environmental activism by citizens and NGOs such as IPE. Although subject to strict government supervision, more than 500 grass-roots environmental NGOs had sprung up in China by October 2008, some 300 more than existed just three years earlier, according to a survey by the All-China Environment Federation.

The widening acceptance of environmental transparency comes as China's ascendance to world manufacturing supremacy has serious side effects on the environment and on its citizens' health. Only 23 percent of China's 26 key lakes and reservoirs are safe for human contact, according to statistics from China's Ministry of Environmental Protection.[4] In mid-2007, industrial waste, urban sewage, and fertilizer runoff created toxic algae that overwhelmed historic Lake Tai in east-central China, interrupting water supplies to about two million local residents. More recently, a solar panel maker south of Shanghai released improperly stored fluoride-laced solid waste into a nearby river, killing fish and livestock.

The central government's calls for environmental vigilance to stem the rising tide of public discontent over pollution[5] often go unheeded at local levels. Local authorities in China historically are far more motivated to protect local businesses that create jobs and economic growth than they are to uphold environmental statutes. China's local environmental protection bureaus (EPBs) are underfunded and inadequately staffed to perform regular inspections of factories. They rely for income on pollution-related fines, which may discourage them from cracking down hard on serious polluters. Bribery of officials is also an issue. Companies often find it cheaper to pay to pollute than to improve environmental performance.

Small Group, Big Mission

Encouraged by the government's new disclosure policies, IPE uses public information to unmask polluters in China. (Exhibit 2 shows IPE's corporate disclosure form that is sent out to major companies.) It is the only NGO in China to have created a comprehensive database of environmental violations. In general, its focus on information transparency and collecting data from all over the country sets it apart from other Chinese environmental NGOs, which tend to focus on education, raising public awareness, and remedial actions, normally at the regional level due to the physical nature of such work. IPE works in coalition with many of these green groups, such as Friends of Green in Tianjin, the South China Nature Society in Guangzhou, and Green River in Chengdu, to carry out its methodology locally.

Working on a shoestring budget of roughly one million yuan annually ($147,000), the little NGO focuses its pressure tactics primarily on multinationals, even though the majority of violators on IPE's list are domestic companies. The reason is simple: Chinese-owned companies are traditionally less motivated than multinationals to protect their reputations in the global marketplace, but they serve multinationals as part of the supply chain.

EXHIBIT 2

IPE Corporate Disclosure Form

Basic Parameters (Mandatory)

Wastewater	
Total Discharged (10^4 Tons/Years)	
COD Discharged (Tons/Year)	
Ammonia-Nitrogen Discharged (Tons/Year)	

Waste Gas	
Total Emission (10^4m^3)	
Sulfur Dioxide Emission (Tons/Year)	
Soot Emission (Tons/Year)	
Dust Emission (Tons/Year)	

Water and Energy Efficiency	
Water Efficiency (Tons of Water/10^4 RMB)	
Energy Efficiency (Tons of Coal Equivalent/10^4 RMB)	

Characteristic Parameters (Optional)

Wastewater	
Suspended Solids (kg/Year)	
Total Phosphorous (kg/Year)	
Volatile Phenols (kg/Year)	
Petroleum (kg/Year)	
Cyanide (kg/Year)	
Sulfide (kg/Year)	
Mercury (kg/Year)	
Lead (kg/Year)	
Cadmium (kg/Year)	
Arsenic (kg/Year)	
Hexavalent Chromium (kg/Year)	
Total Chromium (kg/Year)	
BOD_5 (Tons/Year)	
LAS (kg/Year)	
Benzene Series (kg/Year)	
Nitrobenzene (kg/Year)	
Fresh Water Consumption (10^4 Tons/Years)	

Waste Gas	
Nitrogen Oxides (Tons/Year)	
Carbon Dioxide (Tons/Year)	
Fuel Coal Consumed (Tons/Year)	
Fuel Oil Consumed (Tons/Year)	
Fluoride and its Compounds (kg/Year)	
Hydrogen Sulfide (kg/Year)	
Cyanide (kg/Year)	
Hydrogen Chloride (kg/Year)	
Chlorine (kg/Year)	
Ammonia (kg/Year)	
Sulfuric Acid Mist (kg/Year)	
Chromic Acid Mist (kg/Year)	
Mercury and its Compounds (kg/Year)	
Lead and its Compounds (kg/Year)	
Cadmium and its Compounds (kg/Year)	
Beryllium and its Compounds (kg/Year)	
Volatile Organic Compounds (kg/Year)	
Non-Methane Hydrocarbons (kg/Year)	
Chlorinated Alkanes (kg/Year)	
Benzene Series (kg/Year)	
Xylene (kg/Year)	
Benzopyrenes (kg/Year)	
Acrylonitrile (kg/Year)	
Phenols (kg/Year)	
Acetone (kg/Year)	
Phosgene (kg/Year)	
Methyl Alcohol (kg/Year)	
Mercaptans (kg/Year)	

Other Parameters or Relevant Pollutants Discharge Information

Name (Print): ____________________

Signature: ____________________

Title: ____________________

Date: ____________________

"Few of them come to talk to IPE or pay any attention to this sort of public pressure," says IPE founder and director Ma Jun. "The best way to reach them is to go through the supply chain, to transfer the pressure from those who care to those who don't."

Ma is hitting the nail on the head. NGO scrutiny is Nike's greatest source of pressure for transparency, says Amanda Tucker, Nike's director of sustainable manufacturing performance. IPE's efforts parallel the growing movement among some multinationals, such as Nike, to promote greater transparency and environmental improvement in their supply chains. Since 2005, Nike has implemented an intensive environmental engineering program at 40 footwear suppliers in China and elsewhere in Asia. In addition, Nike audits its active contract apparel suppliers, of which there are 130 in China alone, for environmental, health, and safety compliance. Likewise, Walmart in 2009 began phasing in a new supplier agreement that requires "factories to certify compliance with laws and regulations where they operate, as well as rigorous social and environmental standards."

IPE's Data-rich (and Very Open) Methods

When Ma founded IPE in 2006, he set out to harness government data and the power of the Internet to build a public database of water, air quality, and pollution violations. This was no simple task. The data released by local and regional environmental agencies varied in quality, format, and quantity. To collect and collate the data from all over China, staffers scoured local government, newspaper, and green NGO reports and wrote computer programs to extract and check data.

By December 2010, the non-profit's database contained nearly 74,000 infractions amassed from environmental agencies throughout China. This online database is more complete and accessible than anything publicly available from the central government. IPE's Web site, www.ipe.org.cn (which includes an English translation) contains data going back to 2004 and covering all 31 provinces and more than 300 cities across China. Users can go to the web site, click on the "Pollution Map" tab, and access information on corporate environmental performance by company name, specific locations of pollution sources, environmental news in China, and more.

IPE uses the data to provide the public with a list of polluters operating in China and to write targeted industry reports in a consortium with other Chinese green NGOs, such as Friends of Nature and Green Beagle. In some cases, multinationals contact IPE when they find themselves or their suppliers in IPE's database. They also may receive notification letters from IPE, normally in alliance with other environmental non-profits. Many companies choose to ignore these entreaties. Those that respond are typically embarrassed or angry at IPE to find themselves spotlighted as polluters. "When they enter this room, not every one of them is happy," says Ma. After learning that the data comes from government monitors, however, companies are often ready to explain what went wrong and how they are addressing the problem.

Of course, some observers question IPE's methods, such as using information from China's problematic environmental protection bureaus. "The source data is not always right and that's the difficulty of working in China," says Adam Hughes, the commercial director for U.K.-based BLC Leather Technology Center, which conducts environmental audits of suppliers for members of the Leather Working Group, a collaborative forum for multinational footwear brands. Ma would agree. IPE tries to validate information with multiple sources, but it occasionally has posted violations that an EPB attributed to the wrong company or botched in some other way. That said, Ma contends that the problem of underreporting violations is much greater in China than the problem of false positives. He adds that if a company can provide evidence that some information in IPE's database is wrong, then IPE is more than happy to publish a correction on its website.

To have their violations deleted from IPE's database, companies have a few options, some more onerous than others. For violations more than three years old, a company can provide IPE with documents that prove it has identified the violation's root cause, taken corrective actions, and conducted follow-up monitoring. For violations classified as violations of procedure (such as failure to get the local EPB's sign-off on a requirement's fulfillment), a company can also simply undergo an IPE document review.

For non-procedural violations less than three years old, the company has to accept a third-party environmental audit using a protocol developed by IPE, commissioning a recognized environmental auditor that is approved by IPE to verify that the violation has been corrected and that the company is in full compliance with Chinese environmental regulations. IPE and an alliance of 20 other NGOs then supervise the audit. Representatives from IPE and/or a local environmental NGO, such as Green Hunan or Green Anhui, go to the factory to monitor the whole process as auditors interview managers, walk through the site, and look at how the problem has been addressed. Once the corrections have been verified, IPE writes a public report and shares it with the NGO alliance. If none of the NGOs objects within seven days, IPE deletes the violation from the database and then posts the report on its Web site.

To avoid conflicts of interest, the company receiving the audit pays the auditor at the prevailing market rate, but does not pay either IPE or its local NGO partner for overseeing the audit. Rather, IPE pays its staff and the NGO out of its own funds. The audited company does, however, cover their transportation, accommodation, and meal expenses. Aware that this practice could be abused, IPE requires that staffers overseeing audits do not accept extravagant meals or treatment. "The point is for our involvement to increase the credibility of the audit," Ma said, "Otherwise, what's the point?"

By taking advantage of greater environmental transparency in China and global corporations' desire to protect their reputations, IPE is spurring some multinationals to pay more attention to their Chinese suppliers' environmental records.

IPE designed this NGO-supervised process to outperform the widely adopted ISO 14000 standards for environmental management. Under ISO 14000, a company can be certified as having the right process in place for making continuous environmental improvements, but have excessive toxic waste discharges and be out of compliance with environmental regulations. As Marjorie Yang, chairman of Hong Kong-based premium shirt maker Esquel Group, puts it: "ISO is only a beginning, not the end. That's the paper trail."[6]

According to IPE's Ma, the commoditization of auditing has further compromised ISO 14000: Certification fees have fallen so low that well-known international auditing firms no longer provide the service, leaving domestic Chinese auditors to handle all of the ISO 14000 paperwork. Corruption is a widespread problem in factory auditing in China, exacerbated by low margins and local auditors with relatively poor reputations. IPE's methodology goes beyond paperwork by verifying that the violation has been resolved, pinpointing the problem's cause, and sometimes even identifying additional problems or violations.

For example, in 2007, Chinese authorities fined a Walmart store in Guangdong province 20,000 yuan ($2,930) for cooking food on-site without the necessary pollution control authorization after local residents complained about cooking fumes. IPE posted the violation in its database and, according to IPE, Walmart contacted the nonprofit in April 2008 to discuss it. The company said that it had since installed equipment to capture and clean fumes and particles and had received the necessary government approvals in January 2008. But IPE said Walmart must go through a third-party audit, with a local NGO present, to verify corrective actions before it could be removed from the database.

In July 2008, Walmart hired IPE-accredited URS to do an audit with a local environmental group, Green Pearl River, observing the process. URS confirmed that Walmart had fixed the problems and received the necessary discharge permits, but suggested additional improvements such as installing technology to absorb the smallest smoke particles. In a subsequent audit, URS confirmed the additional corrective steps. IPE accepted the URS reports and removed the violation from its database.

Seven Lessons for Supply Chain Managers

To help supply chain managers leverage information sources such as IPE to improve their supply chains' environmental performance and mitigate the risks of public embarrassment, here are some lessons from multinationals' experiences with the non-profit group.

Lesson 1: Respond quickly to violation notifications. Companies that ignore IPE's entreaties to investigate and fix violations risk bad publicity. Take Timberland's experience in 2009. One newspaper headline screamed: "Timberland Linked to Polluting Factories." The U.S. outdoor footwear and accessories maker had failed to respond to a letter sent by IPE and another Beijing-based environmental non-profit regarding repeated problems at two of Timberland's leather suppliers in China. Both suppliers had ignored the NGOs' earlier efforts to clarify the violations. IPE and Friends of Nature subsequently sent the letter to Timberland's headquarters because of the multinational's perceived influence at the two suppliers and its strong public reputation for transparency and environmental performance.[7] Timberland, for instance, reveals the identities of its suppliers and has created a "Green Index" rating the ecological impact of its products. After the bad publicity that followed its lack of timely response to the NGOs, Timberland promised to review its assessment process, stopped working with one of the Chinese tanneries, and required that the other undergo third-party validation to certify that the issues had been resolved.

Lesson 2: Engage NGOs such as IPE and their coalition partners in a dialogue and commit to work with suppliers to fix problems. In 2010, the little nonprofit, in collaboration with 33 environmental NGOs in China, had begun an extensive examination of the IT industry's involvement in heavy metal pollution in China. Apple was one of 29 IT companies under investigation. (Other big names included HP, Siemens, Vodafone, and Intel.) Apple and its rivals have traditionally refused to disclose their suppliers' names. To find out if Chinese IT factories with heavy metal discharge violations supplied Apple, Ma and his team sifted through factory photos for incriminating logos. They reviewed speeches by Chinese officials and executives for mentions of Chinese factories with Apple connections. They even scoured newspapers following the 2011 earthquake in Japan, searching for reports on Japanese IT suppliers using Chinese factories.

In April 2010, the NGO consortium wrote to the chief executives of the 29 IT companies linked to factories with ongoing discharge violations. It tracked their responses and willingness to fix problems in a series of five reports released between that time and August 2011.[8] Apple ranked last by the time of the fourth and fifth reports, which were subsequently entitled: "The Other Side of Apple." Both Chinese and international press picked up the story. By the year's end—18 months after the initial letter—Apple admitted that 15 out of 22 suppliers cited in the reports were indeed part of its supply chain and agreed to press the suppliers to fix problems.[9] Under pressure from both environmental and fair labor NGOs, Apple in January 2012 disclosed its suppliers publicly for the first time.[10]

Lesson 3: Use IPE's databases to discover gaps in your environmental information about your own operations and those of your suppliers. IPE's databases also reveal information gaps at companies that are collecting, measuring, and analyzing environmental data about their or their suppliers' operations. Executives are often surprised to find their Chinese manufacturing site or supplier on the polluter list. In some cases they even discover through their interactions with IPE that a supplier has been concealing violations from them. For instance, because General Electric regularly audits its suppliers for environmental compliance, it was surprised to learn from IPE that one of its suppliers had three years of wastewater violations. When GE visited the supplier shortly afterwards, the supplier disavowed the violations. According to Ma, the supplier admitted to exceeding wastewater standards only after GE confronted factory managers with the data on IPE's Web site.

Lesson 4: Provide stronger incentives for environmental performance. In the past, suppliers often responded with deception to increased incentives from buyers for environmental improvement rather than with efforts to improve. This made buyers reluctant to increase incentives. However, as the GE example clearly demonstrates, deception becomes more difficult as transparency and NGO scrutiny grow because environmental violations are now more likely to be detected.

Greater Chinese government and public demand for environmental improvement is raising the cost of being called out publicly for violations of multinationals and their suppliers. Chinese authorities, for instance, recently required Conoco Phillips and its Chinese partner to pay one billion yuan ($158 million) to clean up oil leaking from their oil field off China's northeastern coast.[11]

Given these trends, multinational buyers can have greater confidence in the future that enhanced incentives to improve supplier's environmental performance will have the intended effect. Managers should note that buyers need not necessarily pay a higher price per unit when a supplier responds positively to incentives to improve environmental performance. They can instead reward suppliers' investments and efforts by making quantity commitments (perhaps by consolidating the business with a smaller number of suppliers).

Lesson 5: Use IPE's extensive database as a tool to screen potential suppliers and monitor existing ones. Rather than seeing NGOs like IPE as a nuisance, GE is one of a growing number of companies that has recognized the nonprofit's potential as a tool for gaining visibility into its complex, multi-layered supply chain in China. More than 25 companies including GE, Nike, Timberland, Walmart, and Esquel now regularly use IPE's database to screen suppliers for compliance with environmental standards.

The database, for instance, has become a systematic part of Nike's supplier assessment process in China. Nike staff search IPE's site for air and water violations at potential new suppliers before appointing a third-party auditor to conduct an initial compliance assessment at those factories. Nike also supplements regular environmental, health and safety audits of its roughly 150 active contract factories in China by checking IPE's site at least once every six months for new violations. And it receives alerts from IPE if one of its contract factories is going to be listed.

Lesson 6: Gain visibility into your suppliers' suppliers. Nike also has started using IPE's database to extend its reach further into its Chinese supply chain. Like other brands, Nike has historically had little presence at second-tier suppliers. But with the most serious environmental degradation often taking place at upstream factories, environmental NGOs and the public are increasingly training their sights on multinational's relationships to them. Nike is focusing initially on monitoring some 200 key material suppliers (such as leather, fabric, and zipper makers) to its contract footwear and apparel factories.

Lesson 7: Use data from IPE to help suppliers self-identify problems and track their own suppliers. Nike also encourages and even trains key suppliers to use IPE's database to check on themselves and their suppliers in China in order to maintain their green status. Hong Kong-based apparel maker Esquel and two Taiwanese footwear manufacturers, Pou Chen Corp and Feng Tay Enterprises, were among those that did so regularly, to Nike's knowledge.

Because IPE's Web site also provides information on various pollution problems and even remedial approaches, suppliers and buyers can turn to it for help preventing or fixing violations. Esquel, for instance, uses such information to learn and take measures proactively before problems occur.

It is incumbent on supply chain managers everywhere to heed what IPE—and other watchdogs like it—have to say.

Limits of Success

Like Nike, most of the companies now using IPE's database to screen and monitor their Chinese supply chain started doing so only after IPE contacted them about violations. But rather than relying solely on such "name and shame tactics" to encourage enlightened corporate behavior, IPE also wants to provide positive examples of "green leaders" in responsible supply chain management.

However, the results of its first efforts did not meet IPE's hopes. In August 2008, IPE launched the Green Choice Alliance (GCA), under which buyers had to sign letters committing them to walk away from suppliers with outstanding environmental infractions that the suppliers could not or would not fix. GCA members also had to outline on the GCA site their plan to regularly screen suppliers for violations using IPE's databases and report results to GCA. And they had to encourage suppliers to fix problems, submit to third-party verification by IPE-accredited auditors, and do recommended follow-up work and verification. With only Nike and Esquel signing commitment letters by the end of 2010, IPE lowered GCA's original bar to grant membership to all companies that regularly use the database to screen suppliers.

IPE has also struggled to get companies to release environmental information voluntarily to the public.

In coalition with some 15 other NGOs, it has tried sending letters to polluting companies reminding them to disclose emissions, under the open environmental information law. The letters remind companies to disclose emissions data within 30 days of appearing on a local environmental bureau's violators' list. By early last year, the NGO coalition had sent 31 letters, but only a handful of companies met the disclosure requirement after being reminded.

So are NGOs such as IPE really changing corporate behavior at domestic Chinese companies? Clearly, progress is slow, given the ongoing severity of China's pollution problems and the scope of the challenges across such a large and dynamic nation. But it's fair to say that the little NGO is making quite a dent. It punches far above its weight, and will continue to do so. It is incumbent on supply chain managers everywhere to heed what IPE—and other watchdogs like it—have to say.

End Notes

1 This article is based on interviews conducted by the authors and case writer Maria Shao from Nov. 24, 2008 to Nov. 1, 2011 and on information from the IPE's website. All quotes and references are from these interviews and website content unless otherwise noted.

2 Leslie Hook and Katherine Hille, "Apple Attacked Over Pollution in China," *Financial Times*, August 31, 2011. David Barboza, "Apple Cited as Adding to Pollution in China," *The New York Times*, September 1, 2011.

3 See "Dirty Laundry: Unraveling the Corporate Connections to Toxic Water Pollution in China," Greenpeace International, July 2011. "Adidas Group Response to Greenpeace Report," Adidas Group, http://www.adidas-group.com/en/sustainability/statements/2011/Greenpeace_report_Dirty%20Laundry_July_13.aspx (October 11, 2011). Jonathan Watts, "Greenpeace Report Links Western Firms to Chinese River Polluters," *The Guardian*, July 12, 2011.

4 China Water Risk, "Can Fashion Be Green," December 13, 2011, http://chinawaterrisk.org/resources/analysis-reviews/can-fashion-be-green/ (January 18, 2012).

5 Sharon LaFraniere, "Chinese Protesters Accuse Solar Panel Plant of Pollution," NYTimes.com, September 18, 2011, http://www.nytimes.com/2011/09/19/world/asia/chinese-protesters-accuse-solar-panel-plant-of-pollution.html (January 10, 2012)

6 Author Hau Lee is on the board of Esquel.

7 Will Clem, "Timberland Linked to Polluting Factories," *South China Morning Post*, August 7, 2009. http://archive.scmp.com/results.php (October 11, 2011).

8 "Apple: A New Chapter," China Water Risk, December 12, 2011, http://chinawaterrisk.org/resources/analysis-reviews/apple-a-new-chapter/ (January 10, 2012).

9 Besides the *Financial Times* (Hook and Hille, loc. cit.) and the *New York Times* (Barboza, loc. cit.), other media covering the story included: *The China Daily*, Reuters, CNN, and CCTV (China State TV). See Hao Yan, "Apple Manufacturers accused of polluting," *China Daily,* August 31, 2011,

10 Apple, "Apple Suppliers 2011," 2012, http://images.apple.com/supplierresponsibility/pdf/Apple_Supplier_List_2011.pdf (January 16, 2012); and Poornima Gupta, "Apple Reveals Supply Chain, Details Conditions," January 13, 2012, http://www.reuters.com/article/2012/01/13/us-apple-suppliers-idUSTRE80C1KQ20120113 (January 16, 2012).

11 Conoco Phillips agrees $160m payout for China oil spill," BBC, January 25, 2012, http://www.bbc.co.uk/news/business-16713974 (Feb 1, 2012).

Just about every organization is exposed to price changes associated with the commodities they acquire for their operations. These price movements can detrimentally affect profitability, budgeting, cash flow, and overall organizational performance. This article puts forth a flexible process that companies can implement to manage commodity price volatility. It begins by understanding your risk exposure and level of risk tolerance.

By George A. Zsidisin and Janet L. Hartley

As the global economy improves, managers are faced with increasing prices and greater price volatility for key materials and components, energy, and transportation across their supply chains. This article, which is a summary of our recently published book titled *Managing Commodity Price Risk: A Supply Chain Perspective* (Business Expert Press), describes a flexible approach for managing financial risk from commodity price volatility. When commodity prices are volatile, business decisions associated with developing budgets and profit projections, setting prices, deciding when and how much to buy, and negotiating contracts become all the more challenging. The wrong decisions can cut into profit margins, reduce cash flows, and damage relationships with suppliers and customers. To cite one example, in 2011 Kimberly-Clark saw its profits and sales drop due in part to higher-than-expected prices for wood pulp.[1] As a result, the consumer products company was

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A Strategy for Managing Commodity PRICE RISK

forced to raise prices on diapers, a product category experiencing declining sales and increasing competition from store brands.

Commodities are goods that are not differentiated in the marketplace such as metals, energy, and agricultural products. Commodity prices are influenced by supply and demand as well as by trading and speculation; thus, they can be highly volatile. To illustrate, from August 2003 to March 2004, world soybean prices rose from \$237 to \$413 per ton, an increase of 74 percent. They then fell back down to \$256 over the next 24 months. More recently, silver was trading at around \$18 per ounce in April and May of 2010. Less than a year later, silver almost tripled in value to \$49 per ounce during the final week of April 2011.[2] As global economic development increases the worldwide demand for commodities (many of which have a limited supply), prices and volatility will likely continue to increase.

Price volatility affects the direct costs of raw materials, components, subassemblies, and packaging materials purchased as well as indirect costs from the energy consumed in operations and transportation. For example, a food products company such as Kellogg's is exposed to price risk from corn, soybeans, sugar and cocoa that are used in its products; from paper and plastics used in its packaging materials; from natural gas used as energy in its manufacturing facilities; from diesel fuel for transportation in its distribution network; and from energy consumed in its offices and distribution centers.[3]

By understanding and effectively managing price risk, supply chain managers can help their organizations gain a competitive advantage. Managers who understand commodity price volatility make better decisions on the timing and amounts of purchases, and they are better prepared for negotiations with suppliers and customers. Further, understanding commodity price volatility is essential for effective budgeting. Organizations typically develop operating budgets a year or more into the future. The ability to forecast short- and long-term commodity price movements and apply the appropriate management strategies creates stability in an organization's cost structure. Although prices will fluctuate, a solid commodity risk management strategy will enable a company to more accurately assess costs and effectively determine pricing strategies for its products and services.

Estimating Risk Exposure

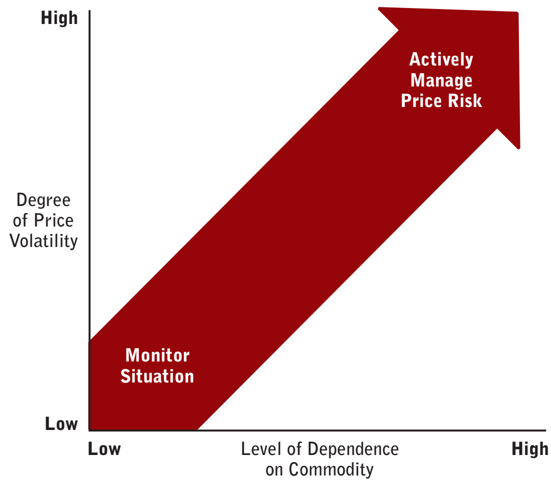
In developing an appropriate strategy for managing commodity price risk you need to assess your organization's risk exposure and level of risk tolerance. Let's begin with risk exposure. The two key factors determining an organization's exposure to commodity price risk are (1) its level of dependence on the commodity and (2) the extent of volatility in the commodity's prices. (See Exhibit 1 on page 48.)

Assessing Dependence on Commodities

Key factors affecting dependence include the amount of a commodity you purchase directly, the amount purchased by upstream suppliers, and the flexibility and ease of substituting the commodity. To assess dependence, begin by conducting a spend analysis to identify the amount of each commodity purchased, by which organizational units, from which suppliers, and at what prices. The spend analysis should include direct purchases that are in the bill of materials for your organization's products and indirect purchases such as energy and transportation. Some commodities, such as natural

EXHIBIT 1

Determining Price Risk Exposure



gas, may be both a direct and an indirect purchase.

For some companies and commodities, doing a spend analysis may be a relatively easy task. Most trucking companies, for example, can easily measure how much they are spending on diesel fuel each year. Similarly, a cereal manufacturer should have a good understanding of how much corn it purchases each year. For organizations that have a multitude of products, operations, and business units, however, a spend analysis can be complex. In these cases, each product may use only a small amount of a certain commodity; but across the entire company the total spend for that commodity could be significant, exposing the company to a high level of price risk. A price risk management strategy needs to focus on all commodities with high spend levels.

In addition to direct purchases, commodities are embedded in parts, components, products, and services purchased from suppliers. Of course, suppliers experience price volatility, too, and they may request price increases and surcharges. In some cases, if commodity prices significantly increase, the supplier may not be able to fulfill contractual requirements. Thus, it is important to assess not only the direct level of spend on a commodity but also to identify upstream suppliers that may be vulnerable to price volatility.

Companies have different levels of tolerance when it comes to the extent of risk they are willing to take in managing their supply chains.

Dependence is also affected by the ability to quickly and easily substitute another commodity for the same purpose. Some examples: Either aluminum or copper may be used in wiring; packaging materials could be plastic or paper; building materials plastic or plywood. If product designs or production processes are flexible—and customers are open to the change or the change is not visible to them—an organization can substitute commodities depending upon price. However, to make certain that a substitution is technically and commercially viable, you often need to make the upfront investment in R&D and market research.

Estimating Extent of Past Price Volatility

As shown in Exhibit 1, the second factor that affects an organization's risk exposure is the commodity's degree of price volatility. If historically a commodity's prices have not varied much and no major changes are expected in the future, exposure to price risk is low. In such cases, monitoring of the situation, as opposed to active management—that is, implementing the various commodity risk management tools, techniques, and strategies discussed in this article—is generally sufficient. Therefore, it is important to know if a commodity's price movements actually have an effect on your firm now or in the future. Of course, unforeseen major events such as the 2011 earthquake and tsunami in Japan can affect commodity prices. However, the probability of such an event occurring in any given timeframe is very low.

You can apply several techniques to assess commodity price volatility. One method is to simply calculate the standard deviation of published weekly or monthly commodity prices over a year. If the overall standard deviation is relatively low in comparison with the mean (average) prices, then price volatility may not be a significant issue. Another technique is to take the range of monthly prices (highest minus lowest observed price) in a year divided by the commodity's mean price. This provides information with regard to the percentage change in the price of the commodity in relation to its average annual price. If prices fluctuate only a few percentage points from the average, this usually indicates minimal historical price risk.

Forecasting Future Commodity Prices

As part of the dependence assessment process, it's important to estimate the direction and volatility of prices in the future. The World Bank (www.worldbank.org) publishes annual commodity forecasts. In addition, a number of services provide market intelligence and forecasts for commodities for a subscription fee. You can develop your own forecasts for the short term (weekly, monthly, quarterly intervals) using technical analysis and long-term (more than one year) by applying fundamental analysis, which can further help predict future price risk exposure. We describe fundamental analysis in more detail next. Typically, short-term forecasts are more accurate than those further out in the future. However, even the best forecasts—short and long term—always contain some margin of error.

Commodity prices are influenced by supply and demand as well as by trading and speculation; thus, they can be highly volatile.

A technical analysis assumes that historical pricing patterns will predict the future. You begin the process by gathering historical commodity price data for the past two to three years. Then you plot the data to observe price patterns and judge if those patterns will continue into the future. Depending on the price patterns observed, statistical forecasting models can be applied, such as weighted moving average, exponential smoothing, trend-adjusted exponential smoothing, or regression. Each forecasting model needs to be assessed for accuracy, with the most accurate model usually used to forecast short-term commodity prices. These models need to be monitored and adjusted as necessary. (Business forecasting books can provide greater detail on how to apply various forecasting tools.)

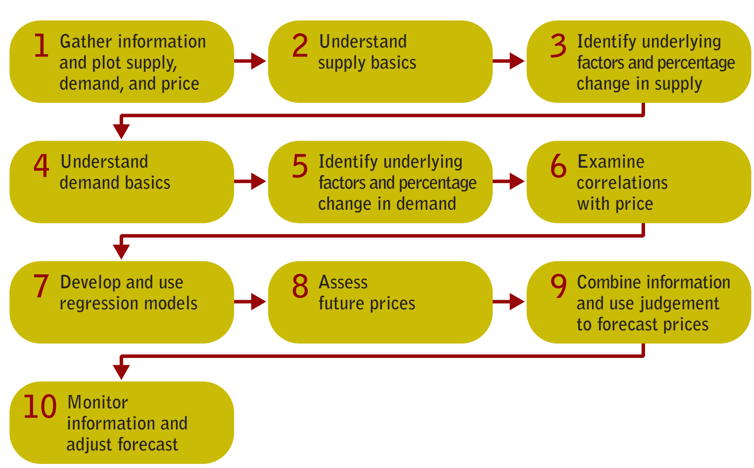
Long-term forecasting uses fundamental analysis, a technique that assumes that the relationship between supply and demand drives commodity prices. In fundamental analysis, you examine the underlying forces that affect supply and demand, estimate how supply and demand will change, and then assess what impact the change has on price. The key steps in this approach are shown in Exhibit 2. The first step is to gather information on supply, demand, and price. This entails plotting supply, demand, and price data and looking at their relationships. The next step consists of understanding the basics of supply and the underlying factors affecting supply, and estimating how supply may change during the future. Similarly, the next two steps—numbers four and five in our graphic—do the same for demand.

After doing a qualitative analysis of supply and demand, the relationships between supply, demand, and price are examined using statistical tools such as correlation analysis and regression. The correlation evaluates the strength and direction of relationships with price. If the correlation is significant, a model to estimate price can be developed using simple linear regression. If there is a futures market for the commodity, the next step (Number 8) consists of incorporating future price trends qualitatively into the analysis. All the knowledge obtained about the commodity—including prices from regression models and futures prices—are combined to develop the final forecast, using judgment such as past experience and in-depth knowledge of the commodity and its markets.

Your organization's overall price risk exposure can be evaluated based on the degree of dependence upon the commodity and the historical and predicted future direction and volatility of commodity prices. A green-yellow-red scale can visually categorize the level of risk. Those commodities whose price risk is high, as indicated by a red rating, should be actively managed. Depending upon your organization's risk tolerance and supply chain resources, you may also decide to actively manage certain commodities that are categorized as yellow.

EXHIBIT 2

Fundamental Analysis Process Steps



Understanding Risk Tolerance

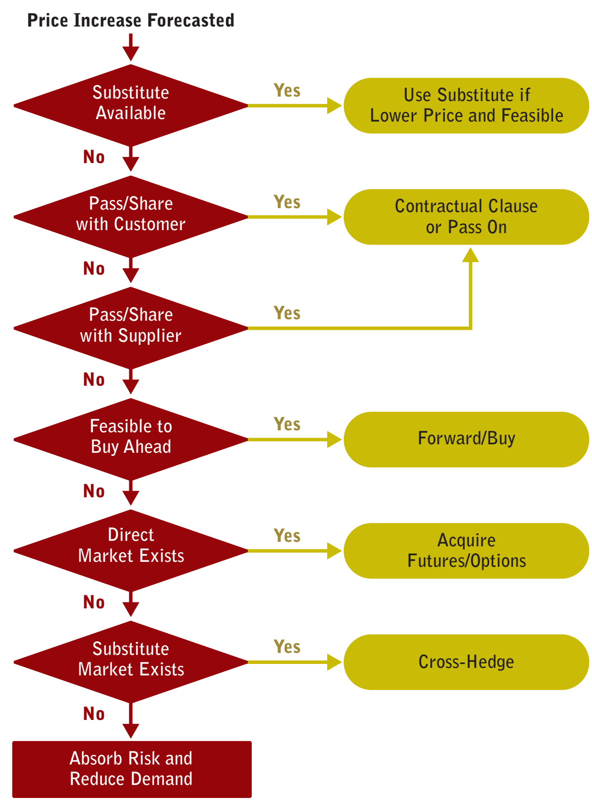
Organizations have different levels of tolerance when it comes to the extent of risk they are willing to take in managing their supply chains. Risk tolerance depends on factors such as the organization's culture, industry, stage of their products in the product lifecycle, customer base, experiences, and corporate leadership. A company's risk tolerance can be generally viewed on a continuum from being risk averse, to risk neutral, to having a high risk appetite. Managers must determine the level of risk exposure at which active management becomes necessary, which will depend on the organization's risk tolerance level. Risk tolerant organizations may be willing to accept greater swings in price movements than their risk adverse counterparts.

Creating a Commodity Price Risk Management Strategy

When the risk exposure and tolerance assessment indicates that active management is needed, a company can consider a number of strategies, as outlined in Exhibit 3. It's important to remember that in pursuing any of these price risk management strategies that flexibility is key—just as it is with managing the overall supply chain. Also, keep in mind that the decisions, actions, and policies enacted today can significantly affect the options available for managing commodity price risk tomorrow. Each of the components of the commodity price risk management strategy is discussed below.

EXHIBIT 3

Process for Creating a Commodity Price Risk Management Strategy



Substituting

When forecasts suggest that commodity prices will increase, explore if your organization has an approved lower-cost substitute material or energy source. If so—and if the total cost savings obtained by shifting to the approved substitute is justified by the commodity's lower purchase price—work cross-functionally to implement the change. A successful example of substitution can be found at The Empowerment Plan, Inc., a Detroit-based non-profit organization. This firm manufactures a convertible coat/sleeping bag product they designed for the homeless. According to Julie Benac of JuliAnn Designs, design consultant for The Empowerment Plan, the product required a wind and water-resistant outer shell. But the heavy nylon that had first been considered was, at \$4.50 per yard, too expensive for mass production. The designers identified an unusual substitute "fabric" that could be found at construction and renovation sites around downtown Detroit—Tyvek. This popular material used for house wrapping possessed all the desired properties of wind and water resistance, and could simply be hosed down to clean. At \$2.75 per yard, Tyvek became the ideal lower-cost substitute, and was easily implemented into the coat design.

If the pricing of a potential substitute commodity shows good initial promise, you then need to assess what it would take to gain approval for the substitute material. Successful substitution of materials in product or production process design almost always requires the input, buy-in, support, and cooperation of multiple internal business functions as well as external supply chain partners. Typically, product design, marketing, operations, purchasing, and logistics are involved in developing and implementing a successful substitution strategy for managing commodity price risk. Be aware, though, that in some cases the cost and time to approve the substitute material may overshadow any cost savings. Further, other companies are likely to make similar substitutions, thereby increasing demand for that material, and ultimately even its price. Again, careful analysis is needed to ensure that the cost savings from substitution will, in fact, materialize.

Passing/Sharing Price Risk

When substitutability is not a viable option, consider whether it makes sense to share or pass on the burden of price risk to customers and/or suppliers. This strategy depends, in part, on how much leverage your organization has in contracting with suppliers or customers. In some industries, such as trucking, passing on price increases to customers in the form of fuel surcharges is a common practice.[4] With regard to steel, we note that steelmakers have increased prices six times from November 2010 through January 2011.[5] Some firms, such as Caterpillar and Emerson Electric, plan to (or already have) increased their product prices to customers in part to offset the 20 percent to 30 percent steel price increases during this timeframe. Other firms, however, such as Whirlpool have found it difficult to fully pass on those costs to customers without losing market share to overseas rivals.[6]

In other industries, such as automotive, steel represents an estimated 4 percent of the cost of a car, or $1,000 of a $25,000 car. So a 20 percent to 30 percent rise in steel costs would have a parallel cost increase of $200. Many automakers would be more likely to absorb those increases than to pass them on to consumers and thereby potentially lose business. Again, depending on the industry and the market situation, it is not always possible to pass on commodity-related price increases to customers.

One option for sharing commodity price risk with customers and/or suppliers is to insert escalator clauses in the contract that distribute the price risk between the two firms. An escalator clause allows for a change in price when a factor (like an increase in commodity prices) that is out of the control of either party affects the product's value. During negotiations, the buyer and supplier can agree on what changes would effectuate the escalator clause, such as an increase or decrease in the commodity price that reaches a certain level, say 5 percent. Frequently an objective, third-party source such as the Producer Price Index is used as a reference point for commodity price increases.[7] Additional factors to consider when inserting escalator clauses include the frequency of review, price remediation processes, and the percentage of price increase each party is responsible for bearing.

Requiring suppliers to bear the price risk of commodities purchased that are part of the bill of materials for your products has its own set of challenges. Price increases can result in the supplier experiencing significant financial losses if it does not have the resources and capabilities to manage price risk. To make up for cost increases, the supplier eventually may take shortcuts that can hamper quality or delivery schedules. The situation could deteriorate to the point of a supply disruption if the supplier cannot profitably make products for your firm.

An alternative to passing on or sharing the price risk of a commodity is to assume the risk by pooling your organization's overall spend with that of the supplier. If your organization spends a significant amount on the commodity and is able to take advantage of volume leverage purchases, then the supplier, who also requires that commodity, may be able to "piggyback" off your contract. In this scenario, the purchasing organization acquires enough of the commodity to meet its requirements as well as those of the supplier, and thereby assumes the price risk of the commodity. This approach is often used when the buyer acquires much higher purchase quantities of the commodity than its suppliers. If your organization has more resources and expertise than your suppliers in managing a particular commodity, this may be an attractive alternative.

Your overall price risk exposure can be evaluated based on the degree of dependence upon the commodity and the historical and predicted future direction and volatility of commodity prices.

Forward Buying

If passing or sharing price risk with supply chain partners is not feasible, the next option might be to consider forward buys, which locks in the prices of future purchases. Forward buys are possible if firms acquire commodities via spot market purchases, and have the capital and capability to acquire and store the material. Yet this strategy also has several distinct disadvantages. For one, forward buys are not compatible with lean supply chain practices. Inventory that is held because of forward buys ties-up capital, hides potential operating problems, increases storage and handling costs, and increases the chance for damage, obsolescence, and spoilage. In addition, forward buys are based on forecasts. So if the prices decrease rather than increase, your organization may have higher costs than competitors who use a different risk management strategy. Thus, it is important to assess if the potential price savings from forward buying will offset the potential cost increases.

To determine if a forward buy is a viable option, ask if your organization has the capability or desire to hold additional inventory for a period of time. This is often dependent on how the commodity is consumed, whether it is part of the bill of materials, or if it is used in support of other activities or processes.

Price volatility affects the direct costs of raw materials, components, subassemblies, and packaging materials purchased as well as indirect costs from the energy consumed in operations and transportation

Hedging Using Futures Contracts

When an organization does not have the ability or desire to execute a forward buy, another option to consider is hedging using futures contracts. A futures contract is an agreement between two parties to buy or sell a commodity at a particular time in the future for a particular price. Contracts are standardized with respect to quality, delivery time, and delivery location.The only variable is price, which is determined by trading in organized commodity exchanges. One of the most popular exchanges in the United States is the Chicago Mercantile Exchange (CME, www.cmegroup.com), which trades contracts for agriculture, energy and metal commodities. Futures contracts are standardized with specific quantity, quality and delivery terms. They are intended to be financial instruments rather than a primary source of the physical commodity.

Hedgers, who are producers or users of a commodity, participate in the futures market to reduce exposure to price risk. Hedging is possible because for commodities, prices in the futures market and the spot market tend to move in parallel to each other. Normally, though, futures prices are higher than the price in the spot market until the delivery month gets closer. Firms purchasing a commodity face the risk of a price increase from the time that they contract with their customers until the commodity is actually purchased. To hedge, users of a commodity buy a contract now and then sell it later before the due date when the price has increased. The gain in the futures market offsets the loss from the increased price when the physical commodity is purchased.

One benefit of hedging compared to forward buying is cash flow. To forward buy a commodity, a company must pay for the entire amount of the commodity when it is purchased. Buying or selling a futures contract requires only a percent of the actual purchase price as an initial margin or performance bond. The initial margin is established by the commodity exchange following government regulations. Commodities with higher levels of price risk typically have higher margins. As the commodity's price changes, an additional "maintenance" margin may be required.

Cross-Hedging

One of the limitations with hedging using futures contracts is that some commodities are not traded in futures markets. Thus, it is not possible to directly hedge them. In such situations, you need to identify a commodity that is traded in futures whose price movements are strongly related to the movements of the actual physical commodity you want to purchase.

The first step with cross-hedging is to identify commodities whose price movements may be similar to the commodity of interest. For example, before a futures market was developed for diesel fuel, firms such as Hershey Foods hedged their diesel fuel surcharges with home heating oil futures, which traditionally has a price movement correlation of over 0.95 with that of diesel.[8] Use correlation and regression to understand the strength of the relationship between historical prices of the two commodities, ideally over at least a 10 year period. If a high correlation is found (a 0.80 correlation is required by Financial Accounting Standards Board standard 133), then do a fundamental analysis of both commodities to estimate the probability that the historical relationship is likely to continue in the future. If so, you can consider cross-hedging as a possible technique for managing commodity price risk.

Absorbing Risk and Reducing Demand

While the techniques outlined above and depicted in Exhibit 3 provide a flexible approach for creating a commodity price risk management strategy, there may be situations where it's simply not possible to pursue the various alternatives presented. For example, there may not currently be any viable substitutes for the commodities your organization uses. Or suppliers and customers may balk at sharing risk—or for a variety of reasons may be unable to do so. With the advent of lean supply chains, to cite one common reason, fewer firms are willing or capable of holding additional inventory. Finally, futures markets may not exist for some of the commodities, or your organization may not have the expertise and resources to use hedging or cross-hedging. For any or all of these reasons, then, there may be times when your firm has no other immediate alternative than to absorb the risk associated with commodity price volatility.

Yet even when companies are forced to absorb the immediate risk, they can work to minimize risk exposure for the future. For supply chain managers, one principal way is to get involved in product and process innovations designed to reduce the demand (usage) for a price-volatile commodity. In the long term, organizations can reduce their exposure to price risk by reducing or eliminating their need for the commodity. For example, many companies have installed new lighting fixtures that use energy efficient light bulbs and sensors that turn off lights when they are not in use to reduce electricity consumption. Redesign of products, processes, and packaging can significantly reduce the demand for a commodity, lowering spend and reducing exposure to price risk while also helping the environment. One example: In 2007, Arrowhead redesigned its water bottle to use 30 percent less plastic while maintaining functionality and achieving a high level of consumer acceptance.[9]

As with substitution, product and process innovation requires collaboration both internally and externally with supply chain partners. The redesign of products and processes to reduce commodity demand may require a large investment in R&D, marketing research, and capital equipment. However, by successfully reducing demand for a commodity, the company reduces its attendant exposure to price risk.

Effective Management the Key

Volatility in commodity prices is an aspect of business that almost every firm encounters either directly or indirectly when managing its supply chains. Further, globalization, population growth, and economic development are increasing the price volatility of many commodities. Unless it is effectively managed, risk exposure from price volatility can detrimentally affect financial performance.

Although price volatility is outside of the direct control of most firms, supply chain managers can use the approach described in this article to develop effective strategies for mitigating price risk. This approach can be used by small and large firms alike and for almost any type of commodity. Through this approach, supply chain managers can improve their organization's financial bottom line, provide cash flow stability for budgeting, participate in designing and improving products and production processes, and prepare for detailed negotiations with suppliers as well as customers.

End Notes:

1 Ziobro, P. (2011, October 24). Kimberly-Clark cuts forecast Amid Costs, Weak Demand, from *The Wall Street Journal*: http://online.wsj.com/article/SB10001424052970204644504576650820004619868.html

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3 Kellogg Company 2010 annual report. (2010).

4 Schlosser, M. A. & Zsidisin G. (2004). Hedging fuel surcharge price fluctuations. *Practix: Good Practices in Purchasing and Supply Chain Management*, Retrieved July 6, 2011, from CAPS Research: www.capsresearch.org

5 Matthews, R. G. (2011, February 3). Steel-prices increases creep into supply chain. Retrieved June 28, 2011 from *The Wall Street Journal*: http://online.wsj.com/article/SB10001424052748704775604576120382801078352.html

6 Matthews, R. G. (2011, February 3). Steel-prices increases creep into supply chain. Retrieved June 28, 2011 from *The Wall Street Journal:* http://online.wsj.com/article/SB10001424052748704775604576120382801078352.html

7 Producer Price Index-Commodities (n.d.).

8 Schlosser, M. A. & Zsidisin G. (2004).

9 Arrowhead develops super-light bottles. (2007). *Design News*, 62 (15), 36.

SUPPLYCHAIN
MANAGEMENT REVIEW

AIR CARGO SPECIAL REPORT

Will 2012 be the Turnaround Year?

By Patrick Burnson

Patrick Burnson is executive editor for Supply Chain Managment Review

While analysts say this should be a growth year for air cargo, pressing challenges such as increasing EU regulation, the pent-up demand in Asia Pacific, and the cost of global security still weigh heavy on the sector.

Industry analysts are predicting that 2012 will be a significant year for air cargo recovery, but not without a new set of challenges that seem to be facing shippers and carriers on all hemispheric fronts.

For example, the troubled European Union (EU) is making life difficult for all airlines by imposing a unilateral carbon-trading scheme. Meanwhile, aircraft manufacturers and shippers agree that biofuels must be gradually introduced across the board.

The Asia Pacific, which is still the most vibrant market for U.S. shippers, may be ceding some of its influence to Latin America. Shippers say that fuel and energy costs associated with onerous environmental laws will make "near shoring" more attractive over the next year. (Exhibit 1 on page 56 shows the growing fuel imact on air carrier operating costs over the past decade.)

And don't forget the security issue that is ongoing for global shippers or carriers. However, with a more harmonized security system in place, global shippers may finally get a break on compliance expenses.

So, with a slowly improving global economy juxtaposed against this growing list of challenges, is the air cargo industry poised for a comeback? The Boeing Company certainly thinks so. Having ended 2011 with a solid earnings report, the company says it reflects continued strong core performance across its businesses.

"Strong fourth quarter operating performance, record revenue and backlog, and expanded earnings and cash flow capped a year of substantial progress for Boeing in 2011," said Jim McNerney, Boeing chairman, president, and CEO. "We enter 2012 with renewed momentum, and proven business and

Air China, Boeing, and Chinese and U.S. aviation energy partners conducted China's first sustainable biofuel flight late last year. The two-hour mainland flight from Beijing Capital International Airport was witnessed by officials from both countries and highlights the viability of using sustainable aviation biofuel sourced in China.

product strategies," he says. "With an intense focus on productivity, we're well positioned to deliver growth and increased competitiveness in the air cargo arena"

John Leahy, chief operating officer for Airbus, is equally bullish, saying that the air cargo freighter fleet alone will double in the next 20 years. "Meanwhile shippers moving freight on passenger aircraft will drive even more growth," says Leahy. "Our global market forecast foresees investment in freight-bearing aircraft exceeding $3.5 trillion in that time frame," he says.

Industry analysts support these rosy predictions, noting that more and more commodities are now regarded as "perishables" and will be moved via air no matter what the cost or challenge. In fact, food, pharmaceuticals, and bio-med products are being joined by fashion and high-tech components in the just-in-time universe of global sourcing and are being packed into aircraft bellies at higher volumes.

Indeed, air transport, while still the most expensive transportation option, is now increasingly used by companies to actually save money, says Luciana Suran, an economist with global real estate consultancy CB Richard Ellis Economic Advisors. "In some cases, companies can save by flying in cargo to meet customer demand rather than spend the money warehousing their goods and distributing them throughout the U.S. and Canada," she said. "Nike is a good example."

So, while analysts say this should be a growth year for air cargo, pressing challenges such as increasing regulation, the pent-up demand in Asia Pacific, and global security improvements still weigh heavy on the sector. Here's a look at those challenges and ways that both shippers and carriers can work to overcome them.

EU's Pressure Point

As if the EU didn't have enough problems these days, it's also earned a great deal of enmity from its air cargo trading partners as of late.

When the EU Emissions Trading Scheme (ETS) was initially introduced last year, it appeared to be an intra-European solution that would avoid uncoordinated tax measures. But the scope was extended beyond Europe's borders and there was no let-up in taxation.

Departure taxes in the UK, Germany, and Austria—introduced as environmental measures—cost over €4 billion. At current prices for UN issued Certified Emissions Reductions, that would offset aviation's global CO_2 emissions about one-and-a-half times.

"And ETS is coming on top of that," says Tony Tyler, director general and CEO of the International Air Transport Association (IATA). In fact, non-European governments, including the U.S., see this extra-territorial tax collection as an attack on their sovereignty. However, they are taking action.

"Aviation can ill afford to be caught in an escalating political or trade conflict over the EU ETS," says Tyler. "The International Civil Aviation Organization (ICAO) is the only way forward. I sense a greater appreciation in Europe that a global solution under ICAO may take time, but it will produce a superior result. It's more important than ever for Europe to be a fully

Exhibit 1: Fuel Impact on Operating Costs

Year	% of Operating Costs	Average Price per Barrel of Crude	Break-even Price per Barrel	Total Fuel Cost
2003	14%	$28.8	$23.4	$44 billion
2004	17%	$38.3	$34.5	$65 billion
2005	22%	$54.5	$51.8	$91 billion
2006	26%	$65.1	$68.3	$117 billion
2007	28%	$73.0	$82.2	$135 billion
2008	33%	$99.0	$88.9	$189 billion
2009	26%	$62.0	$55.4	$125 billion
2010	26%	$79.4	$91.0	$139 billion
2011 F	30%	$112.0	$116.3	$178 billion
2012 F	32%	$99.0	$101.1	$198 billion

Updated: 12/2011 Next Update: 3/2012 Source: Industry Financial Forecast Table (IATA Economics)

engaged participant in discussions at ICAO aimed at delivering a global solution."

"This further isolates the EU from the rest of the world and will keep in place a unilateral scheme that is counterproductive to concerted global action on aviation and climate change," says Charles "Chuck" Clowdis, managing director of global commerce and transport advisory services at IHS Global Insight. "The irony is that all the world's airlines want to address climate change and make a move toward more sustainable energy."

According to IATA, the aviation "value chain" is committed to improving fuel efficiency by an average of 1.5 percent annually to 2020, capping net emissions from 2020 with carbon-neutral growth and cutting its carbon footprint in half by 2050 compared to 2005 levels.

"Improvements in technology, operations, and infrastructure as well as the use of positive economic measures are needed to achieve this," says Tyler.

To underscore this issue, analysts note that Air China, Boeing, and Chinese and U.S. aviation energy partners conducted China's first sustainable bio-fuel flight late last year. The two-hour mainland flight from Beijing Capital International Airport was witnessed by officials from both countries and highlights the viability of using sustainable aviation bio-fuel sourced in China.

Asia Pacific's Pent up Demand

The fact that this new fuel demonstration took place in China should certainly not come as a surprise. Airfreight rates for Asia outbound shipments rose 4.6 percent in January over the same month a year ago, the first year-over-year increase in Drewry's Air Freight Price Index in 15 months.

The Drewry index also jumped 8.4 percent from December, signaling that demand remained relatively solid after the late-2011 holidays as airlines kept capacity in check. The measure of 109.6 posted in December 2011 was the highest point since the Drewry index reached its 2011 high of 114 in October.

And on that news, the Year of the Dragon was ushered in with forecasts for continued air cargo growth in the Asia Pacific. Airlines in the region will take delivery of more than 9,370 new aircraft over the next 20 years, according to the latest market forecast by Airbus. Valued at $1.3 trillion, the deliveries will account for 34 percent of all new aircraft with more than 100 seats entering service worldwide over the forecast period, with the region overtaking North America and Europe as the world's largest air transport market.

However, Washington, D.C-based Airfowarders Association (AfA) Executive Director Brandon Fried says that while Asia remains a strong market for his constituents, other options are emerging, too.

"The industry is already seeing some softening in Asian markets where North American buyers are beginning to source products from neighboring countries," says Fried. "This means that as time passes, more opportunities will develop throughout Latin America as well."

Increasing Cost of Security

Irrespective of regional growth, however, is the ongoing battle waged by the cargo community against global terrorism. Shippers who have been burdened by the cost of security may get little relief in the near future, say analysts.

However, IATA has urged broad cooperation among industry and governments to realize the "Checkpoint of the Future." Given the growing quantity of freight moving in the bellies of passenger aircraft, such a move may be crucial.

Forwarders' concerns

With their annual conference coming up in Miami this month, the Air Forwarders Association (AfA) will focus on a variety of concerns addressed in these pages. In an exclusive interview, AfA's Executive Director Brandon Fried shared his views on some of the more pressing issues facing air cargo shippers as we roll into 2012.

SCMR: AirCargo 2012 places a heavy emphasis on opportunities for U.S. shippers in Latin American. Why the geographic shift this year?

Brandon Fried: While the Asia Pacific remains dominant, we see some softening in the markets there. North American buyers are beginning to source products from this hemisphere to save on fuel and total landed cost expenses.

SCMR: To what extent will your constituents be discussing carbon trading?

Fried: The European Union Emissions Trading Scheme has generated much attention to this important issue since the unilateral initiative threatens to increase airfreight and airline passenger related costs significantly. No doubt several of our air carrier attendees will be discussing this initiative that seems to be gaining momentum.

SCMR: What is the AfA's position?

Fried: Well, the AfA believes that excessive carbon burning is a primary cause behind a worldwide problem of global warming and that any solution intended to deal with the issue must be harmonized with all countries. We disagree with the EU's unilateral approach that fails to consider the opinions of other nations while imposing financial hardship to those carriers serving its member states.

The preferred solution is to work with other countries through the International Civil Aviation Organization (ICAO) in drafting a workable plan that restricts carbon emissions in a mutually agreeable manner. We regret that the EU has failed to include outside country input in its program, and we urge a reconsideration that focuses on a more global approach.

SCMR: What commodity groups are leading growth?

Fried: The two significant commodity groups that appear to be leading growth are electronics and textiles. We expect this activity to continue throughout the year.

SCMR: Any new specific demands coming from emerging nations?

Fried: Probably the biggest demand coming from emerging nations is the need for industrial and logistics expertise. These nations are just beginning to experience an increased rate of growth calling for trained individuals who understand the challenges of growing factory output and moving products overseas quickly and efficiently.

SCMR: How soon will bio-fuels become relevant?

Fried: Many of our members are beginning to incorporate fuel-efficient equipment into their trucking and aviation fleets. Some are even powered with bio-fuels that while experimental, hold much promise for the future. We are extremely excited because the use of this energy is capable of reducing our carbon footprint while decreasing dependence on foreign oil.

SCMR: Finally, are there any other issues global air shippers should be aware of?

Fried: The industry is becoming more technology-driven. We should expect much more emphasis on bill of lading data element analysis before shipments depart—hopefully resulting in less scrutiny and a higher level of trust for frequent shippers.

"The Checkpoint of the Future envisages using passenger data collected for immigration authorities to differentiate airport screening," says IATA's Tyler. "Secondly, it incorporates technology expected to be available in a 10-year timeframe to enable passengers to walk through checkpoints without stopping or unpacking."

Along with support from Interpol, the European Commission, the U.S. Department of Homeland Security, and the Chinese government, 16 states have endorsed the Checkpoint of the Future concept. The International Air Cargo Association (TIACA) endorses this view too, and is promoting its own agenda for international growth.

"We believe that countries should view air routes as highways in the sky, a competitive public good every bit as important as surface transportation infrastructure," says TIACA's Secretary General Daniel Fernandez. "Under a fully liberalized aviation environment, numerous new international highways in the sky are possible that would markedly improve the speed and accessibility of a nation's businesses to their global suppliers and customers."

In so doing, says Fernandez, the competitiveness of a nation's businesses will increase, more foreign direct investment will be attracted and economic development promoted.

Dr. Walter Kemmsies, Moffatt & Nichol's chief economist concurs with Fernandez, but says any discussion of "highways in the sky" means more investment in existing infrastructure. "Shippers are paying for enough logistical support as it is," says Kemmsies. "It's time for governments to start providing incentives for addressing fuel costs, sustainability, and security. As an American, I say the buck stops here."

—Patrick Burnson is Executive Editor of Supply Chain Management Review


WATER
TAXI

The Case for Supplier Development

By Mike Hales and Raj Arumugam

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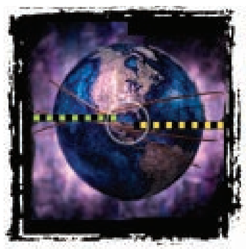


The recent backlash surrounding worker conditions at one of Apple's supplier facilities is a prime example of why companies need a focused supplier development program as part of their overall Supplier Relationship Management (SRM) initiative. As companies like Apple and others have discovered, the liability these supplier relationships pose to the image of a company can be significant.

It is important to understand the key elements of an effective supplier development program, which are designed to:

- Establish, define, and govern the relationship
- Observe, monitor, improve, and sustain operations.
- Transfer technology and lend financial support.
- Train management and the workforce.
- Enforce environmental and social compliance.
- Identify and mitigate all sources of risk.

Historically, most mid-size and large companies have had some type of supplier development program, which typically included a supplier certification program. It was common for companies to conduct on-site audits and implement performance improvement plans. In recent years, however, with the advent of more sophisticated technology and intense cost-cutting pressures, many companies have diluted their supplier development activities. In fact, in many cases they no longer require on-site supplier audits.

Companies that have diluted their supplier development programs have lost an opportunity to build better relationships with existing suppliers and to begin solid relationships with new ones. Moreover, they have left themselves open to a variety of risks. With a robust supplier development program, companies can establish trust through a heightened commitment to their supply partners.

Benefits of Supplier Development

We have seen a number of recent examples that underscore the criticality of a supplier development program. One company, for example, effectively manages supplier continuity risk through its healthy relationships with key suppliers. So when a government action forced a temporary plant closure of one of the company's suppliers, the positive relationship that the company had established ensured that the supplier provided the company with the needed supplies of the material, whereas other companies had their supplies cut off. In another case, a company wanted to develop low cost country sources to serve as an alternate supply source to their main suppliers to gain price advantage. The company invested in a supplier development program with the low cost suppliers over a two-year period before it actually started buying from these sources. This up-front investment allowed the buyer to leverage these new sources of supply in negotiations with their regular supply base. The end result: major cost savings.

To succeed, a supplier development program requires participation and cooperation from both internal and external stakeholders. A cross-functional team representing internal stakeholders and with an executive sponsor needs to be created. This team gets the internal stakeholders on board and then ensures alignment of the external stakeholders to successfully accomplish the initiative.

In the past, a supplier relationship may have been considered strategic based on spend volume, location, transaction history, or longevity. But in reality, these "strategic" relationships often never went beyond fulfilling orders and exhibited only superficial levels of collaboration. Further, there was no effort to tap into the hidden potential of these relationships.

Importance of the Audit

To capture this potential, companies need to take

EXHIBIT 1

Supplier Audit Scoring Sheet

Supplier Name	XYZ Company
Audit Team	John Smith, Wei Chen, Pravin Patel, Ram Charan, and Alex Horn
Audit Date	12/12/2011
Category	MRO
Raw Material Name	Bearing 07125-05

Audit Score										
People	**Process**	**Technology**	**Quality**	**Management**	**Finance**	**Innovation**	**Supply Risk**	**Environment**	**Accreditations**	**Total Score**
6	8	8	7	9	10	4	8	8	10	78

Action Items	Financial Cost	Expected Completion Date	Completion Date	Responsible	Priority
Redesign Process	$125,000	2/1/2012		John Yu	High
Leaky Warehouse	$75,000	12/30/2011		Emily Yang	High
Change Scheduling Process	N/A	12/30/2011		Emma Li	High

Audit Frequency (Per Year)			
Audit Score	**Segment**	**Frequency**	
80-100	World-Class	N/A	Audited only when an issue arises, otherwise relationship maintained through regular meetings (strategic suppliers)
60-79	Tier II	Annual	Audited on an annual basis and effort put in to drive supplier toward world-class
40-59	Tier III	Bi-annual	Supplier development activities are carried out only if there is a strategic importance in qualifying supplier
20-39	Tier IV	Quarterly	Supplier development activities are carried out only if there is a strategic importance in qualifying supplier
0-19	Tier V	Not Qualified	Supplier not considered for approval

a fresh look at the strategy and practices of their supplier development program. A foundational component of any successful program is the onsite audit at the supplier's facility—a process that deepens knowledge of the supplier and sets the agenda for managing the relationship. A proven methodology for conducting an onsite audit is outlined below:

- Organization—management, people, quality, innovation.
- Resources—technology, process.
- Health—finance, supply risk.
- Responsibility—environment, and certifications.

The onsite supplier audit, carried out by a cross-functional team, covers these various areas and includes corresponding sub-sections. Each sub-section comprises a list of questions that guides the team members during the audit and uses a scoring system to record supplier performance.

Sub-section scores are tabulated and performance gaps are identified at the end of the audit. The audit team draws out a performance improvement contract and assigns a final audit score based on sub-section scores. (Exhibit 1 shows a sample supplier audit scoring sheet.) The audit score is used to determine audit frequency and to motivate the supplier to achieve world-class status by providing a road map in the form of a performance improvement contract, signed by a key stakeholder from the supplier side.

Follow-up audits are scheduled based on these factors: business priority, supplier classification tier, performance improvement contract, and audit score. The audit score and the performance improvement contract are updated at the end of each audit. Typical audit frequencies are shown at the bottom on Exhibit 1.

Companies are operating in an environment in which their actions often are judged based on their environmental and social responsibility impacts. Increasingly, they realize that it is not just their actions that attract scrutiny and generate criticism, but also the actions of their supply partners. As a result, a number of major corporations have had to either alter supplier relationships or force suppliers to take corrective actions.

Activism, consumer awareness, and the influences of social media are factors that can magnify the damages to a company's reputation when a surprise supplier discovery surfaces. Companies that diligently monitor the activities of supply partners on a regular and consistent basis protect themselves from such external threats through proactive management and the ability to mitigate issues as they arise.

Perspectives from the Top

"Executive Insights" is a special section in this issue of SCMR. *In the following pages we interview top executives from leading supply chain software companies, logistics services providers, and professional associations. They offer their insights and observations on market trends, emerging user preferences, and the shape of the supply chain future.*

Aligning Goals of Customer and Carrier

Q&A with Rick O'Dell, President and CEO, Saia Inc.

Q: What are the biggest challenges facing supply chain professionals today?

A: Supply chain professionals and the trucking industry are facing a number of challenges including slow economic recovery, driver shortages, increasing fuel costs, and tight capacity. However, other looming issues include government regulation with regard to hours-of-service (HOS), the nation's crumbling infrastructure, and the increase of regulatory and equipment-related expenses associated with doing business. It is my belief, that the uncertainty surrounding possible changes to the HOS rule will decrease productivity, worsen driver shortage, and exacerbate highway congestion.

With regard to infrastructure, the country's highways, bridges, and roads are deteriorating at an alarming rate and there has not been any concrete plan put forth to fix the problem—or fund these crucial repairs. The government's failure to invest in our infrastructure is not only hurting businesses but the economy as a whole. An offshoot of this issue is the increase in tolls being added at the state and local level to fund budget shortfalls and finance repairs.

Q: What are users looking for most in providers of transportation and logistics services?

A: Customers continue to seek out carriers that offer consistent, reliable service and real-time data. They want to make sure every dollar they spend on transportation counts by choosing carriers who offer them the opportunity to shine in front of their customers. A carrier must understand their customers' business and shipping requirements. Many shippers look for a partner carrier that provides transparency in their data, evolution in their service and products, and the latest technology with regard to customer service and safety.

Rick O'Dell

Q: What are the keys to a successful relationship between user and services provider?

A: At the consignee, the carrier delivering their goods is their shipper. Because a carrier is so important to the way a consignee perceives the shipper, it is important to have a strong relationship with the carrier you are trusting to deliver your goods. They must form a true partnership where the relationship is built on mutual need, quality, reliability, communication, and success. When this is done, a customer will receive personalized service from their carrier and real customer service. When issues arise, there is a desire from both the carrier and the shipper to work together for an immediate, successful resolution.

At the end of the day, a successful relationship will show that a carrier's and a customer's goals are aligned and a trust is established through performance and communication.

A Convergence of Domestic and Global Solutions

Q&A with Jim Preuninger, Chief Executive Officer, Amber Road

Q: What are users telling you they look for most in a supply chain solution today?

A: Customers are increasingly interested in global trade management (GTM) solutions that are flexible enough to support different supply chain segmentation strategies. GTM solutions must adapt to address the different needs of multiple supply chains within the same software system and shared network of suppliers, logistics providers, and customers. In particular, systems must be able to:

• Extend processes to suppliers and logistics providers.
• Manage logistics and compliance activities within one solution.
• Tune or configure business processes to support the segments' needs.
• Provide one centralized view of the global supply chain across all segments.
• Capture all associated data to support reporting and "predictive analytics."

For example, an organization may need supply chain processes that are specialized to goods with unpredictable demand, such as the latest fashion. The same organization may also provide goods with more predictable demand that require steady replenishment. Similarly, other goods may have higher import and export compliance requirements that must be carefully managed.

Q: Any suggestions on how to make an effective business case for investing in supply chain technology?

A: Although any business case is dependent on the timeframe and complexity of the proposed solution, some basic guidelines apply:

Jim Preuninger

• Define the end vision and determine which initiatives are needed to realize that vision. Initiatives could be longer-term/strategic or shorter- term/tactical, so strike a balance between what can be achieved quickly versus what may need to be implemented in phases over a longer period.
• Gather metrics that can be tied back to the vision, and determine what those values are at present and what they will look like in the future state.
• Understand the costs of working with your business partners. These costs may include the different levels of service rendered by your logistics providers and the terms under which you operate with your suppliers. How will these costs be affected by a supply chain solution?

An effective business case will show manageable and quantifiable cost savings or revenue growth as a direct effect of implementing the supply chain technology.

Q: What are the most important criteria for evaluating and selecting a provider of supply chain solutions or software?

A: Because past success is usually a good indicator, look for a provider that has previously solved complex GTM problems for a large, global enterprise. Don't be afraid to request a site visit with a customer that has similar issues to your own.

From a knowledge perspective, look for a provider that operates seamlessly in both logistics and compliance domains and that has experienced compliance experts on staff, not just as consultants.

Q: What is the next big breakthrough in supply chain technology?

A: I believe we'll see continuing convergence of domestic and global supply chain solutions as a requirement for effectively meeting the needs of global organizations. Today's fragmented solutions can't meet the end-to-end process needs of enterprises with complex and diverse supply chains.

Developing Skills for Today and Tomorrow

Q&A with Paul Novak, CPSM, C.P.M., A.P.P., MCIPS, Chief Executive Officer, Institute for Supply Management

Q: What are the main skills supply chain professionals will need going forward?

A: Supply chain professionals touch every business function. Business acumen is a concept we hear all the time. What exactly does that mean? First, supply professionals must understand the short- and long-term strategy of the organization and not only how supply fits into the strategy but what they can do to accomplish the goals. Second, understanding finance and how supply management contributes to the overall financial health of the organization.

In many instances, supply management represents the organization to the rest of world. Globalization has not only taken supply management to the executive table but supply professionals are usually the first feet on the ground when a new facility or supplier is secured in other parts of the world. This requires understanding different cultures, geopolitics, and values where the organization is doing business. We are already experiencing shortages of key materials and the potential for inflation is present in every country.

Today's professionals will need the skills to deal with these issues.

Q: What is the value of professional development and continuing education to the individual and to his or her organization?

A: In an ever-changing environment there is a constant need to have knowledge, skills, and abilities that are current. Professional development is essential to make sure skills are up to the challenges of today and tomorrow. Those organizations that invested in learning during the last few years will have the competitive advantage as the economy continues to improve. Their staff is up-to-date and poised for the challenges that are part of supply management. You might find that companies that restricted professional development are struggling to get up to speed and losing opportunities along the way.

Paul Novak

Q: What is the role of professional associations in today's complex and global supply chain environment?

A: Associations play a unique role in today's environment. Members look to their organization not only to deliver knowledge, but to provide knowledge that is relevant to their specific needs. The one-size-fits-all approach is no longer viable. The challenge for associations is to stay on top of what is needed and develop and deliver that knowledge. Fortunately, technology provides tools to obtain crucial information about our members. Associations can use this information to create a knowledge strategy.

Q: How does your organization keep current with the evolving supply chain needs of the membership?

A: ISM uses our Board of Directors, leaders of supply management, to scan what is happening as well as identifying emerging trends. They provide ISM with a macro-view of global trends as well as trends within their own industries. We also look to the expertise of our members for a micro-view of supply management. CAPS Research is our partner and we can tap into their knowledge. Combined, this expertise provides ISM with a backbone to develop our programs and activities.

Intuitive, Easy-to-Use Solutions Needed

Q&A with Jim Kizielewicz, senior vice president, corporate strategy and chief marketing officer, Kronos

Q: What are users telling you they look for most in software and solutions today?

A: Consumer oriented technology—such as the iPad and the smartphone—has forever transformed the way people interact with technology. Users today are looking for similar mobility and ease of use in business applications as well. What we're seeing with labor management systems is that whether it's a manager accessing real-time staffing information so they can reallocate labor instantly from overstaffed to understaffed orders—or field-based workers looking to track time against specific tasks or deliveries—the workforce is always evolving. And labor management solutions need to evolve as well and be intuitive and easy to use for quicker adoption across the workforce.

Q: Any suggestions on how to make an effective business case for investing in technology for use in the supply chain space?

A: In today's volatile supply chain market capacity is tight, margins are often razor thin, and leaders are looking to deliver the best possible services often by getting more out of the limited resources they have available. When it comes to labor management, outdated or manual systems often can add waste that erodes productivity or adds costs that negatively affect the bottom line. Lack of accurate visibility into labor costs associated with customers, tasks or orders is the problem. The first step toward making a business case for labor management should be mining the data you have available.

Jim Kizielewicz

There are three key areas of information to evaluate when you are developing a business case for labor management:

- *Depth: How Much Data Do You Have?* How uniform are your labor management approaches across multiple warehouses?
- *Accuracy: How Reliable Is Your Data?* How accurately can you allocate paid time to orders shipped?
- *Visibility: How Actionable is It?* What would it mean to overall workforce efficiency if you could identify productivity issues and take corrective action in real-time?

If you can't see how paid time is spent—for which tasks, when, and by whom—you can't control labor costs, such as unnecessary overtime and non-productive time. Unseen and uncontrollable labor costs can have a significant impact on profit margins. Idle or underutilized workers create non-value-added labor expenses—for example in a $10M payroll, just 5 percent in non-productive time wastes $500,000 annually.

Finding just 2 percent or 5 percent of additional productivity per employee per day can generate huge value to the organization.

Q: What are the most important criteria for evaluating and selecting a provider of solutions or software?

A: A provider should understand your unique challenges and offer a solution that is easy to use so it integrates with your existing technologies and processes seamlessly with minimal change management or disruption.

A solution also needs to be flexible and scale/adapt with changing business conditions. This will provide lower long-term total cost of ownership without requiring costly customizations. Services need to be comprehensive and support your IT resources, budget, and payment preferences.

Budgets and resources are often tight so look for solutions that can help you maximize your budgets and resources with payment and deployment options to meet every need.

Collaboration, Communication, and Consistency

Q&A with Pat Reed, Executive Vice President and COO, FedEx Freight

Q: What are the biggest challenges facing supply chain professionals today?

A: There are a number of regulatory and legislative measures in development that will influence both supply chain managers and providers. We feel it is important for carriers and shippers to monitor potential changes and work to inform agencies and legislators about issues that affect our industry, including the need for efficient supply chains to support commerce.

Q: What are users looking for most in providers of logistics and supply chain services?

A: Shippers are looking for choice, reliability, and simplicity. FedEx Freight believes companies must focus on adding value for customers. Before launching our FedEx Freight® Priority and FedEx Freight® Economy services, we conducted extensive customer research and designed our business model based on how customers plan their supply chains.

Pat Reed

As part of one of the broadest transportation portfolios in the industry, we focus on helping customers find the right FedEx solution for their needs. In addition to unique service choices, we are also leveraging FedEx technology to simplify LTL transactions, helping customers save time and increase productivity.

We recently added FedEx Freight to FedEx Ship Manager® Software, which helps customers manage multiple LTL shipments through the same platform used for FedEx Express and FedEx Ground services. We are exploring options to further automate, making it easier for customers to ship with FedEx Freight and access the FedEx portfolio of reliable services.

Q: What are the keys to a successful relationship between user and services provider?

A: Collaboration, communication, and consistency are all essential. FedEx Freight continuously takes focused steps to understand our customers' business objectives and shipping challenges in order to ensure that we provide the service choices and solutions that will meet customer needs. Mutual communication is facilitated through both face-to-face and automated channels.

Our drivers work hard to establish positive relationships with our customers, and our technology enables our customers to be informed about the status of their shipments, through services like FedEx Freight Advance Notice® that can send notification on the rare occasion when a shipment might be delayed. Our customers demand consistency in both pickups and deliveries, which is why we work so hard to maintain the reliability in our Priority and Economy services for which FedEx Freight is known.

Q: What are the keys ways in which logistics/supply chain services providers can improve their client's productivity?

A: Providing reliable services cannot be overstated. If customers can depend upon their carrier every day, their shipping processes become more efficient and they can focus on their other responsibilities for their businesses.

In addition, the way a carrier provides those services can improve customers' productivity. For example, having added FedEx Freight to FedEx Ship Manager electronic tools, customers can save time processing each bill of lading because they can set preferences to automatically enter shipping information, rather than manually entering recipient addresses. At FedEx Freight, we will continue to collaborate with our customers and use technology to gain improvements in efficiency that will benefit our customers.

Users Have a Broad Range of Expectations

Q&A with Daniel Vertachnik, EVP and CCO, MercuryGate

Q: What are users telling you they look for most in supply chain software and solutions today?

A: While user expectations vary from company to company, most users of transportation management solutions, who are probably not all that different from users of other supply chain solutions, are more often looking for holistic solutions where they can work with a single vendor to meet their end-to-end requirements from buy to sell. They look for solutions that allow for collaboration across all trading partners and that give them complete visibility of their supply chain. They are looking for systems that not only capture large amounts of data but that also offer strong capabilities to utilize that data to optimize and model their networks and to provide the analytics that enable them to make sound business decisions that will give them a competitive edge in their market.

Users are looking for software solutions that allow them to react quickly to their customers and their markets, solutions that are cost effective and that can rapidly scale to meet the ever changing requirements of their customers—from the smallest to the largest.

Today's users are looking for functionally rich solutions that are easy to use and easy to deploy—whether they choose to deploy in the Software as a Service environment or in an onsite license environment. Users want solutions where training requirements are minimal and customer support is strong, solutions that have a common look and feel throughout, those that offer a quick delivery process that enables a rapid time to market, and where total cost of ownership allows for a rapid return on investment.

Daniel Vertachnik

And users are looking to work with vendors that understand what they do, that can show them how their solutions will improve their business. They want vendors they can trust and that have a long-term commitment to the continuing success of their user community.

Q: Any suggestions on how to make an effective business case for investing in supply chain technology?

A: We all understand the importance of offering best-of-breed technology, providing a competitive edge, low cost of entry, rapid implementation and time to value, a rapid return on investment, and improving shareholder equity for our client partners. We are anxious to talk to these points. What we always need to remember is that when a company enters into a software selection process, they usually have specific concerns and business issues unique to them they are looking to resolve.

To build an effective business case for investing in supply chain technology you first need to understand your prospect's business, their markets and customers, their business processes, their workflow. And you need to identify with them the key critical business issues they are facing.

Do they have a need to be more competitive in their market, to improve operational efficiency, reduce costs? Are they being driven by new customer requirements or market expansion?

There can be a number of factors driving an engagement. Until you can identify, what keeps your client awake at night and how you can help them sleep, they have no reason to invest with you and what you bring to the table.

A SPECIAL SUPPLEMENT TO:
SUPPLYCHAIN MANAGEMENT REVIEW
Logistics MANAGEMENT

MODEX 2012
SOLUTIONS THAT MOVE SUPPLY CHAINS

(AM)
(AFTER MODEX)

New show, new city, new solutions

By Supply Chain Group Staff

Held for the first time ever, *Modex 2012—the nation's newest expo for materials handling, supply chain, and logistics solutions—threw open its doors in Atlanta on February 6 at The Georgia World Congress Center.* *(continued)*

The event hosted more than 20,000 visitors to the trade show and educational conference, and was sponsored by the Material Handling Industry of America (MHIA).

Spread over four days, attendees found more than 586 exhibitors covering 180,000 square feet; three keynote speakers discussing all aspects of supply chain management; 70 show-floor educational seminars; and no less than 30 different educational sessions and networking events presented by 17 different co-located partners.

The Modex 2012 conference featured leading-edge topics in manufacturing, distribution, and supply chain management, exploring subjects such as the impact of the Panama Canal expansion to sustainability, security, and visibility.

In addition to learning more about the big picture in supply chain, Modex 2012 attendees discovered new equipment solutions to streamline operations and improve visibility, maximize efficiency and flexibility, cut costs, and speed time to market.

"Participants came with very specific objectives and with buying plans in hand," says George Prest, CEO of MHIA. "They know that investing in the latest supply chain equipment and technology is the key to building and maintaining their competitive edge."

According to Prest, the inaugural Modex met, and in many cases exceeded, exhibitors' and attendees' expectations. "Attendees were impressed with the wide range of equipment and systems solutions and education offered at Modex, and exhibitors expressed satisfaction with the quantity and quality of attendees," he added.

Day 1 Keynote:
To secure future, CSCMP head says logistics industry must make its voice heard

In his show-opening keynote address, Rick Blasgen, CEO of the Council of Supply Chain Management Professionals (CSCMP), expressed optimism for the future of domestic logistics, emphasized the urgent steps that must be taken to secure that future, and hailed the materials handling industry as a key driver of the ongoing economic recovery.

Rick Blasgen, CEO of the Council of Supply Chain Management Professionals (CSCMP)

"The supply chain is the shock absorber managing the difference between what is planned and what actually happens," said Blasgen. "We facilitate a lot of what happens in our economy and we don't get a lot of credit for it. We need to get out and tell our story."

In his 25-year career in supply chain management, Blasgen said he has seen the discipline become not just a corporate necessity, but evolve into a essential growth vehicle for nearly every organization. According to Blasgen, logistics spending in the U.S. totaled $1.2 trillion in 2011, constituting 8.3 percent of GDP. In 1980, logistics accounted for 17.9 percent of GDP. Blasgen credited vastly improved supply chain efficiency for the decline.

Of last year's $1.2 trillion, transportation costs accounted for $768 billion, he said. It's a highly physical business, said Blasgen, and one that is dependent on increasingly inadequate infrastructure. "The U.S. needs a national transportation policy," he said. "That much is glaringly obvious."

Blasgen said that the management of transportation will be a focus in 2012, followed closely by access to capacity, continuing efforts by shippers to outsource, and a gradual shift to a 'truckers' market."

But most importantly, said Blasgen, is that current supply chain leaders challenge and educate the industry's young generation. "The supply chain will be run by technically savvy people with a penchant for innovation," said Blasgen. "If you're new to this industry, go work on the third shift in some distribution center. It will help you immensely."

Day 2 Keynote:
New Panama Canal enhances global connectivity


Alberto Aleman Zubieta, CEO of the Panama Canal Authority

In 2014, the Panama Canal will celebrate its centennial. It will also celebrate the opening of the expanded Panama Canal, according to Alberto Aleman Zubieta, CEO of the Panama Canal Authority and Day 2 keynote speaker

The new locks, which are currently under construction, will expand the canal's ability to handle ships nearly three times the size of current ships—an estimated 14,000 containers versus 5,000-container capacity today—and double the throughput capacity of the canal.

More importantly, said Aleman, the expanded canal and the logistics capabilities of Panama can serve as the logistics hub of the Americas. "Panama is the only port with terminals in two oceans," he said. "It is just 80 kilometers from ocean to ocean and we have more port cranes in Panama than Chile, Mexico, and Brazil."

In that sense, he added, the new canal is not so much about capacity, but connectivity. "You can use Panama as a platform to connect the Americas and the Caribbean," he said. "That is important if you want to conquer those markets and expand your supply chain and your procurement capabilities."

To take advantage of the new canal, Aleman added, the U.S. must think about investing in its transportation infrastructure, including expanded ports, new rail capacity, and improvements in our highways. For instance, only the ports in Virginia and New York can presently handle the larger ships that will come through the canal.

"What concerns me is how long it takes to do these types of projects and that they are not now being done in the U.S.," Aleman said. "You must realize that you are in a globalized economy. If you do not do it, someone else will. If you don't capture those markets, someone else will."

Day 3 Keynote:
Global trade awareness important to businesses of all sizes

Donald Ratliffe, executive director of the Georgia Tech Supply Chain and Logistics Institute, illustrated the global relationships between logistics and trade at his Modex keynote address on the morning of Day 3.

Ratliffe outlined the change over the past 40 years in materials handling, from a focus within the four walls to its current impact on logistics on a larger scale. The ongoing paradigm shift, he said, is driven by the individual organization's need to understand global trade dynamics.


Donald Ratliffe, executive director of the Georgia Tech Supply Chain and Logistics Institute

He presented global trade data indicating a marked trend toward regionalization over the past decade that has been driven by the relationship between capital, inventory, and time in transit. "In some cases we've been too smart," said Ratliffe. "The focus on 'lean' has become near-zero inventory, which is alright until you have any kind of hiccup, at which point you've actually increased you risk."

And because each government throughout the world is both an essential trade partner and potential paperwork nightmare, Ratliffe emphasized the need for the public sector to become more educated about and more invested in improving the realities of logistics.

"You listen to any politician talk about logistics and it doesn't take long to realize they don't have any idea what they're talking about," said Ratliffe. "The U.S. doesn't have the government infrastructure to support export in the way that most other big exporting countries do. We've relied on the private sector to handle it."

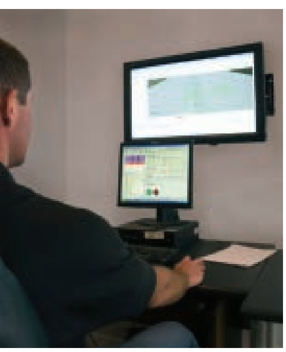
Ratliffe also echoed Alberto Alemán Zubieta, CEO of the Panama Canal Authority and Day 2 keynote presenter, in highlighting the shortcomings of U.S. port capacity. That said, he added, port capacity improvements will require additional focus upstream and downstream to avoid a conflict between bigger ships and better service.

"We've got a big built-in disadvantage that is based mostly in logistics," said Ratliffe. "We have the capability to export more stuff, but we're just not focused on doing it."

Modex 2012
Product Highlights

Warehouse control platform offered as complete system or by component

For control of material flow, orders, wave picking execution, and automated machine control, Intelligrated offers InControlWare warehouse control system is offered. Engineered to efficiently manage machine and operational resources, the software increases facility capacity and lowers distribution costs through optimized workflow, equipment usage, and order fulfillment. It is scalable and may be integrated as a complete system or by individual area component manager, including order, route, pick, carousel and crane. The user interface provides visibility into operations, orders, inventory, fulfillment and machine performance, along with extensive reporting. **Intelligrated, www.intelligrated.com.**



Mini-load cranes move 660-pound loads up to 78 feet

Providing an automated shelf solution for containers, boxes and trays, SSI Schaefer Systems' SMC 2 and SMC 2 XL twin-mast mini-load cranes use a closed lifting trolley to hold two standard, or one large, piece of load-carrying equipment. The machines access heights up to 39 feet or 78 feet respectively for high payloads and greater throughput. Load-carrying equipment includes combined telescopes, grippers, and pulling fixtures for containers or trays, and box and package grippers. Due to low clearance requirements, the devices optimize space and feature extremely stable masts with very high torque resistance. New drive technology enables the transport loads up to 660 pounds due to a mast reinforcement strut—guided through a recessed groove—that prevents vibration. **SSI Schaefer Systems, www.ssi-schaefer.us.**

Mobile, on-demand label printing/computing station ready to roll

For efficient inventory management and related tasks in warehouses, distribution centers, and manufacturing facilities, the Mobile Powered Workstation from Newcastle Systems offers on-board power to run a computer, a high-volume label printer, and other devices simultaneously, creating a fully mobile label printing/computing station. Generous shelf space provides room for products and other items. With 6-inch rubber swivel casters and no cord trailing behind, the workstation can be easily rolled and positioned for optimal productivity. The casters can be locked for stability once the workstation is in place. All models have a load capacity of 500 pounds. The unit's rechargeable battery offers integrated, seamless power for up to 12+ hours of normal use. **Newcastle Systems, www.newcastlesys.com.**

Extended piece picking functionality featured

Dematic introduced extended picking functionality of its goods-to-person order fulfillment solution for piece picking, or RapidPick, on the show floor. "Last year at ProMat we introduced a one-to-one solution that allows an order selector to pick from one SKU position into one order position," said John Baysore, president and CEO of Dematic North America. "Our extended functionality allows an order selector to pick to multiple order positions." A typical configuration, he added, might be one SKU position to 6, 12, or 24 order positions. However, the modular design of the solution allows the end

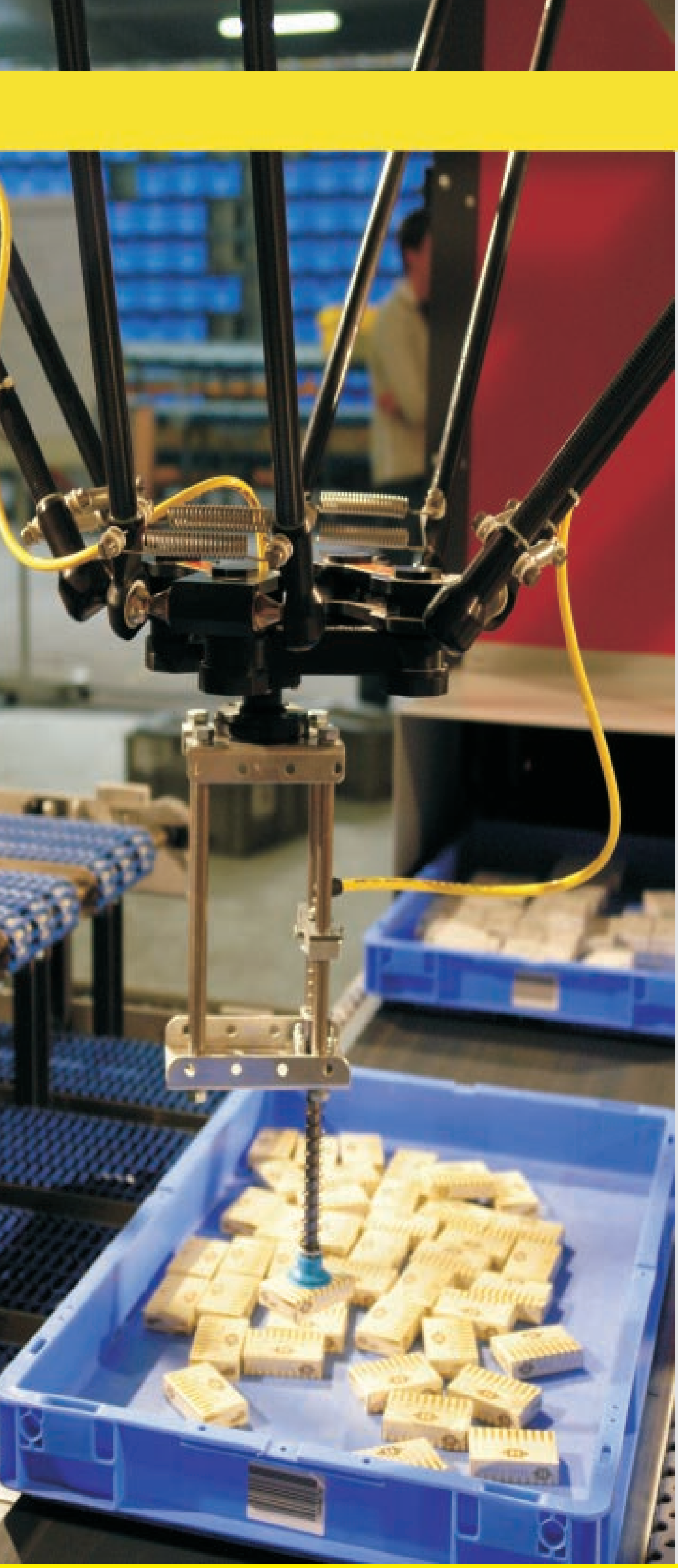
user to configure the pick station with the quantity of order positions that is most productive for their application. In addition, the system now includes the ability to handle cartons of varying sizes in addition to totes. **Dematic, www.dematic.com/na.**

Next generation of agile, ultra reliable electric lift trucks

The next generation of agile, productive, and ultra reliable electric lift trucks where showcased on the floor. Leading the way in ergonomics and performance, Yale Materials Handling Corp.'s ERC-VA series is among the most productive and highly durable electric lift trucks on the market. New features and updates include: newly designed, industry-leading operator compartments and comfort; 16 percent more floor space; relocated multifunction displays that ensure enhanced visibility and precise pallet control; improved brake pedal layout; auto Deceleration Systems which reduce operator fatigue; and steel hoods that provide for maximum battery service access. **Yale Materials Handling Corporation, www.yale.com.**

Ergonomic advances on new cost-effective trucks touted

Noting an increase in customers who prefer short-term leases, Hyster has released a line of more cost-effective IC trucks. The product lineup of versatile lift trucks reinforces the company's range of application-specific flexibility and industry-leading ship-to-shelf




- Start>Location>Locations
START
LOCATION
Add
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Modex 2012 Product Highlights *(continued)*

capabilities. "We're trying to get the right truck to the right customer," said Jonathan Dawley, president of Hyster Distribution. Hyster showcased new four-wheeled trucks with the exact same performance and turning profiles of a three-wheeled truck. The addition of the fourth wheel disperses bumps on the travel surface for improved operator comfort. **Hyster, www.hyster.com**

▲ Use vertical space for storage, goods-to-person picking

For goods-to-person picking that increases efficiency and productivity, Kardex Remstar offers its line of dynamic storage solutions includes vertical lift modules, horizontal carousels, vertical carousels, mobile shelving, and integrated software. From receiving and order processing to replenishment and cycle counting, the technologies save floor space and increase accuracy. The equipment eliminates wasted walk and search time to increase productivity up to 66 percent, while reducing floor space requirements by up to 85 percent by using vertical storage space. **Kardex Remstar, www.kardexremstar.com.**

Full line of integrated, automated material handling systems offered

A full line of integrated automated storage/retrieval systems, automatic identification products, conveyors, order picking systems, RFID, sortation equipment, software and systems integration services are offered to assembly and production facilities, warehousing and distribution center operations. Knapp Logistics Automation specializes in semi- and fully-automated order fulfillment and assembly systems that focus on high speed/high volume each picking. Benefits include a reduction in order cycle times, a decrease error rates, optimized inventory and lower operating costs. **Knapp Logistics Automation Inc, www.knapp.com.**

No Easy Answers on RFID Strategy

Determining which RFID tagging strategy is right for your organization demands a clear understanding of customer requirements and careful analysis of related costs. There's no one-size-fits-all solution.

By Becky Partida, Knowledge Specialist-Supply Chain Management, APQC

Interest in supply chain visibility and mandates from customers such as Walmart and the U.S. Department of Defense have fueled interest in the use of radio frequency identification (RFID) systems in the supply chain. In addition, groups such as the Voluntary Interindustry Commerce Solutions Association (VICS) advocate the use of RFID tagging at the product-item level in the retail industry as a way of ensuring traceability and increasing the safety of consumer, pharmaceutical, and food products. The potential benefits for organizations using RFID tags have been widely touted: greater accuracy in tracking inventory, more efficient inventory counting, better on-shelf availability of products at retail locations, improved trend forecasting, and reductions in counterfeit products.

However, APQC's Open Standards Benchmarking in Logistics indicates that 59 percent of responding organizations have no RFID tagging strategy at all (see Exhibit 1). The remaining 41 percent use the following RFID tagging strategies most often:

- Tag all products in manufacturing.
- Slap tags on products before shipping to comply with customer mandates ("slap-and-ship").
- Maintain separate inventory of tagged and untagged items.

Choosing a Strategy

When making a decision about which RFID strategy to choose (or whether to use one at all), organizations must look beyond the initial cost of adopting the technology to other factors such as the potential benefits of adoption and the effects of the strategy on performance metrics. Participants in APQC's *Open Standards Benchmarking with RFID* tagging strategies were asked to select up to three of five possible benefits that they believed would result from implementing an RFID tagging strategy. These benefits were:

- Improved distribution processes.
- Completed compliance requirements.
- Reduced distribution center/warehouse cost.
- Improved trading relationships.
- Reduced inventory.

Of the possible benefits, the three selected most were improved distribution processes (selected by 32 percent), completed compliance requirements (29 percent), and reduced distribution center/warehouse cost (21 percent). The desire of organizations to meet compliance requirements aligns closely with the trend of companies such as Walmart requiring their suppliers to place RFID tags on products prior to shipping.

To gain greater insight into how an RFID tagging program can affect an organization's supply chain function, APQC sought to analyze the effects of RFID strategies on three logistics metrics:

1. Percentage of sales orders delivered on time.
2. Total cost to operate warehousing.
3. Total systems cost to operate warehousing.

APQC compared the performance of organizations that adopted the three most popular RFID tagging strategies (tag all products in manufacturing, slap-and-ship, maintain separate inventory of tagged and untagged items) to the performance of those organizations without RFID strategies.

The results of the analysis indicate that organizations without RFID tagging strategies perform neither the best nor the worst on each of the three logistics metrics. Moreover, organizations following the other RFID strategies posted mixed performance results, as shown in Exhibit 2. An RFID tagging strategy should reflect the priorities of an organization. One key question in this regard: is it more important for the organization to meet customer delivery dates or to get the lowest cost?

EXHIBIT 1

RFID Tagging Strategies

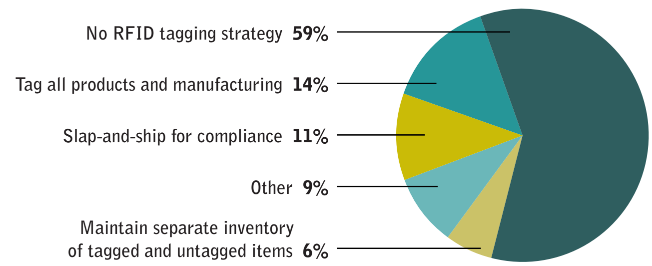


EXHIBIT 2

Ranking of Performance Regarding Key Logistics Metrics

RFID Strategy	Sales Orders On Time	Total Cost to Operate Warehousing	Total Systems Cost to Operate Warehousing
No RFID tagging strategy	3	2	3
Tag all products and manufacturing	1	3	4
Slap-and-ship for compliance	2	4	2
Maintain separate inventory of tagged and untagged items	4	1	1

(Note: A ranking of 1 indicates best performance among the groups; a ranking of 4 indicates worst performance.)

RFID Impact on Distribution Processes

APQC sought to evaluate the effect of an RFID tagging strategy on an organization's distribution process by analyzing the percentage of sales orders delivered on time. We found that for this metric, performance is not significantly affected by the RFID tagging strategy adopted. Organizations maintaining separate inventories of tagged and untagged items have the lowest performance, with 93 percent of sales orders delivered on time at the median, or midpoint. Those that place RFID tags on all products during the manufacturing stage have the highest percentage of sales orders delivered on time (95 percent at the median).

Although APQC cannot confirm the direct cause of these results, the higher performance obtained by organizations tagging all products could be linked to the RFID tagging being done as part of the manufacturing process, rather than at the warehouse. Placing tags on pallets may add to the delivery time for organizations with a slap-and-ship RFID strategy.

Organizations maintaining separate inventories may have the lowest percentage of sales orders delivered on time because of the extra time required to retrieve product information from separate inventories. In addition to the initial cost of implementing an RFID system, companies need to consider how implementing a specific type of RFID program could affect performance indicators such as the percentage of orders delivered to customers on time.

Warehousing Operating Costs

One key cost metric that may be affected by an organization's RFID tagging strategy is the total cost of operating warehousing. For its benchmarking, APQC defines operating warehousing as all activities related to receiving products, storing products, shipping products for outbound delivery, and tracking shipments. The total cost for warehousing includes the annual costs associated with personnel, systems, overhead, and outsourcing, as well any miscellaneous costs associated with operating a warehouse. The difference in median total cost among the groups is significant (see Exhibit 3).

Organizations maintaining separate inventories of tagged and untagged products have the lowest total cost associated with operating warehousing (at the median, \$2.67 per \$1,000 in revenue). Organizations using a slap-and-ship strategy have the highest total cost (at the median, \$11.41 per \$1,000 in revenue). For an organization with \$5 billion in revenue annually, the difference in median cost between the two strategies would be \$43,700,000.

EXHIBIT 3

Median Total Cost of the Process "Operating Warehousing"

(per $1,000 in Revenue)

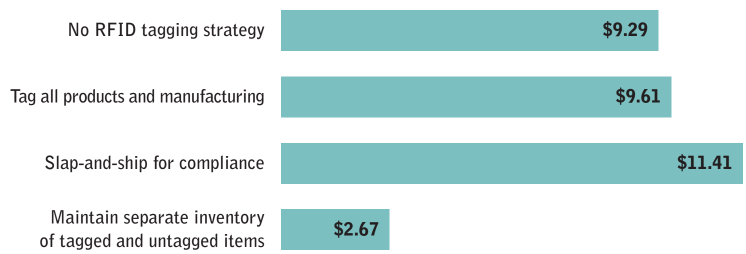
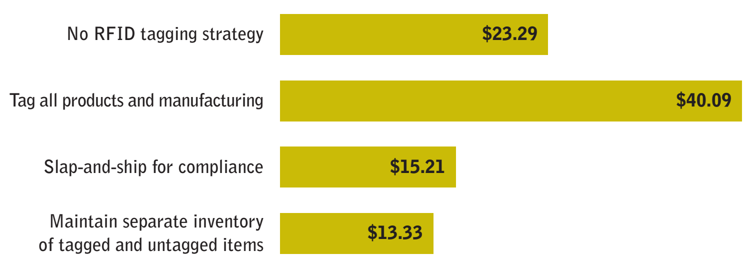


EXHIBIT 4

Median Systems Cost of the Process "Operating Warehouse"

(per $100,000 in Revenue)



The higher operating cost for organizations using a slap-and-ship strategy could result from the extra labor needed to place and monitor tags on pallets destined for specific customers. It may not be possible to opt out of tagging products intended for certain customers, but organizations should consider the potential for higher warehousing costs associated with using this tagging strategy.

A related cost metric is the systems cost associated with operating warehousing. APQC defines systems cost as the total of all normal expenses related to providing and servicing computer hardware and software. At the median, the difference in systems cost among the groups is staggering, as Exhibit 4 shows.

Organizations maintaining separate inventories for products with and without RFID tags have the lowest median systems cost associated with operating warehousing: $13.33 per $100,000 in revenue. Those that tag all products during manufacturing have the highest cost at $40.09 per $100,000 in revenue. For an organization with $5 billion in revenue, the difference in the median systems cost of the two strategies would be $1,338,000—a substantial difference in the normal technology cost associated with having an RFID tagging strategy. Again, organizations must weigh the benefits with the potential for additional costs when deciding if an investment in an RFID tagging system is worthwhile.

It is also important to consider systems costs in the context of the larger picture. Employing a technology like RFID is not free (as Exhibit 4 shows), but the benefits of the investment may show in lower total costs (Exhibit 3). For example, organizations tagging all products have a higher systems cost; however, these same organizations do not have the highest total cost for operating warehousing. This may mean that more of the process as a whole is automated, which would reduce the personnel time needed to operate warehousing and ultimately lead to a lower total cost.

No One-Size-Fits-All Solution

There are different RFID tagging strategies that organizations can adopt depending on enterprise needs and customer requirements. To determine its particular needs, an organization should conduct several internal evaluations. Current logistics processes should be analyzed to determine which are the most important to the success of the organization. Then the organization needs to identify how an RFID tagging system could fit in or improve those processes. It also should conduct a site survey of a potential installation location to determine how a tagging system would function within the organization on a day-to-day basis.

In determining its circumstances, an organization must also consider the cost of not investing in RFID technology. Would the company struggle to catch up if competitors adopted the technology? More importantly, would it mean the loss of customers to a competitor? And how much would profitability suffer?

There is no one-size-fits-all solution for RFID tagging. An organization should evaluate its unique circumstances and consider the potential for additional costs and longer delivery times when determining which RFID tagging strategy (if any) is the right choice.

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	TRACK A Supply Chain Strategy	TRACK B Supply Chain Planning	TRACK C Sourcing and Procurement	TRACK D Manufacturing Excellence
Sunday, May 20				
2:00 p.m.	Registration			
Monday, May 21				
7:00 a.m.	Registration			
7:00 a.m.	Networking Breakfast by Industry and Hot Topics			
8:00 a.m.	**K1. Gartner Keynote Survive or Thrive in an Age of Uncertainty**			
8:45 a.m.	Networking Break			
9:15 a.m.	**K2. Guest Keynote What Matters Now** *Gary Hamel*			
10:15 a.m.	Networking Break			
10:45 a.m.	**A1.** The Supply Chain of the Future: Mitigation, Adaptation and Transformation in a Changing World *Stephen Stokes, Steven Steutermann*	**B1.** Panel: Managing Global Sales and Operations Planning *Michael Uskert, various panelists*	**C1.** Strategic Advantage Through the Right Global Sourcing Strategies *Michael Dominy, Stan Aronow*	**D1.** Agility and Segmentation for the Manufacturing Network *Matthew Davis, Barry Blake*
11:45 a.m.	Attendee Lunch and Solution Showcase Dessert Reception			
1:30 p.m.	**A2.** Customer-Driven Supply Chain: Customer Segmentation, Supply Chain Segmentation and Cost-to-Serve *Matthew Davis, Stan Aronow*	**B2.** The Quest for Demand Management Excellence: Progress So Far *TBD*	**C2.** Sourcing Innovation Speeds Great Products to Market *Mike Burkett*	**D2.** Factory of the Future: Next-Generation Manufacturing Strategy *Simon Jacobson, Leif Eriksen*
2:45 p.m.	Sponsor Provider Sessions			
4:00 p.m.	**A3.** Value Chain Transformation: Achieving Orchestration	**B3.** The Six Essentials of Strategic Planning *Matthew Davis*	**C3.** Gaining Value and Reducing Risk With Sustainable Procurement	**D3.** Designing and Managing the Optimal Global Manufacturing

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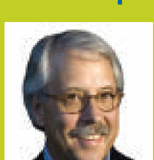

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