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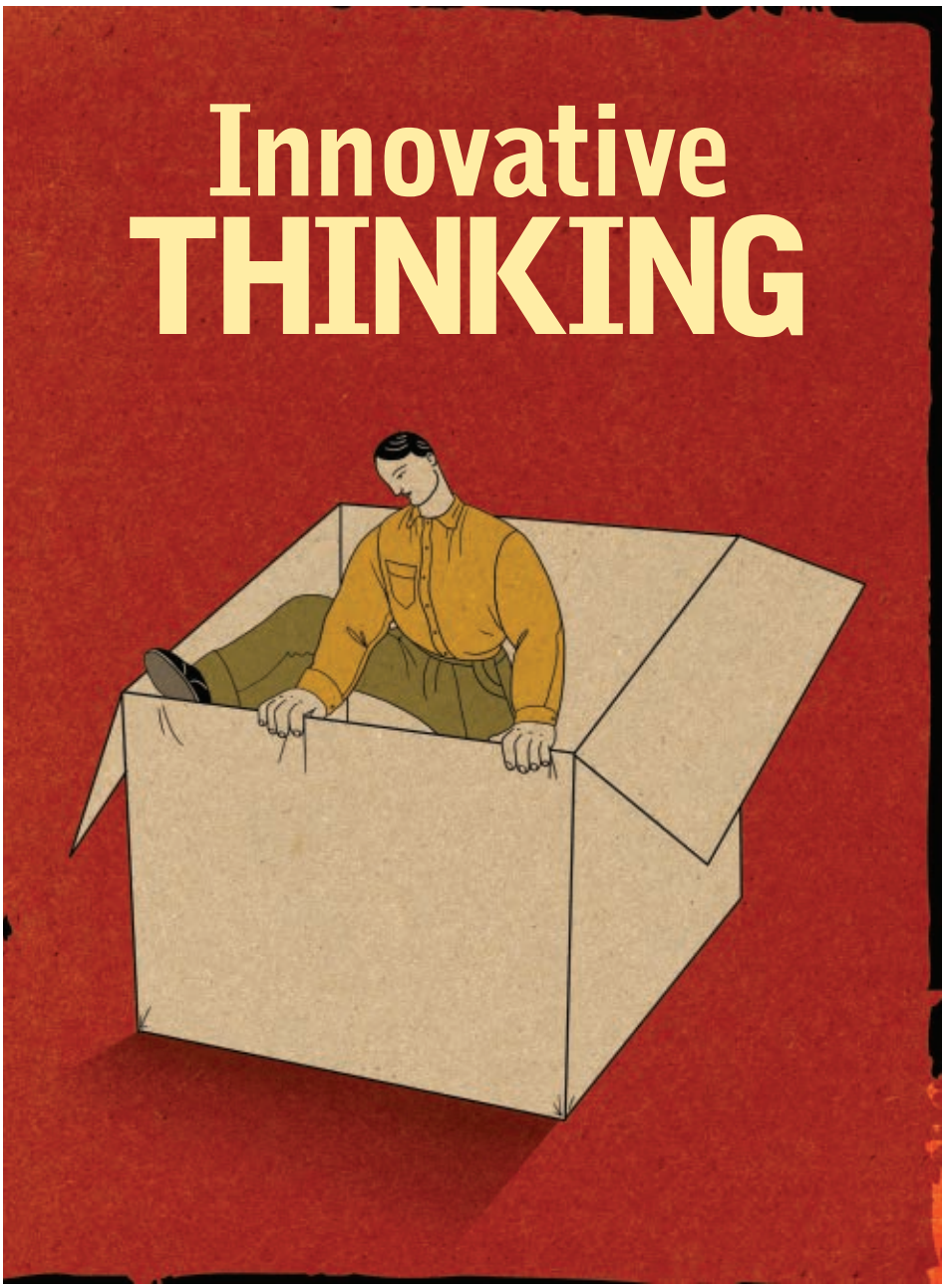

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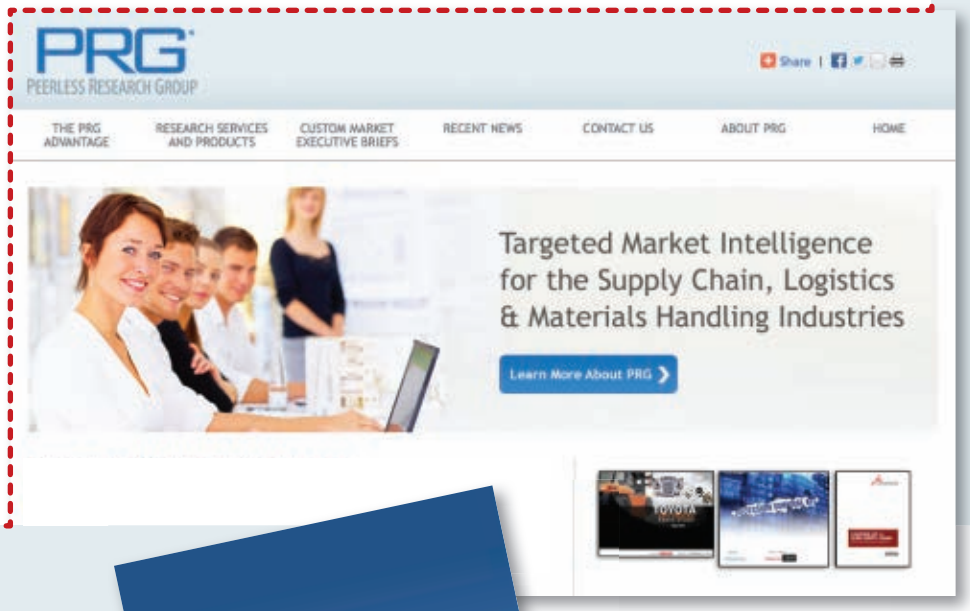

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Innovation Inside and Out

Frank Quinn, Editor
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Our cover illustration of "Innovative thinking" depicts an individual—a reader of *Supply Chain Management Review* we'd like to think—climbing out of a box. Too literal an interpretation? Too clichéd? Too corny, even?

OK, well maybe a qualified "yes" to each of those questions. But the more we thought about the recurring theme of innovation in this issue, the more we became convinced that the box metaphor was the right way to go.

Now we're not really talking about physical boxes that constrain us (though some no doubt view their offices or cubes in that regard), but rather the mental confines. These can be stubborn barriers. And the most stubborn one of all, you could argue, is the "but this is the way we've always done things" way of thinking.

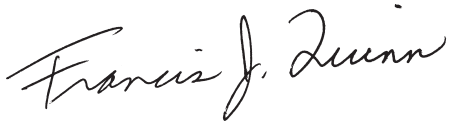
Innovation in the supply chain context comes in different forms and from different sources. In our feature story on Steelcase, for example, the innovation described originated from within the organization. The office furniture maker's supply chain was growing far and wide, and with this growth came increased supply management risk. How to get a handle on the situation? The answer was an internally developed initiative—they called it the Global Procurement Process (GPP)—that linked supply risk management to procurement activities.

By making this unconventional linkage, Steelcase not only established an effective supply risk management protocol, but also improved overall procurement operations.

Yet while internal innovation is a traditional and proven way to go, it's not the only way. In fact, more and more companies are looking outside of their organizations for innovative input. In explaining this concept that is often referred to as "open innovation," Accenture consultants and their co-authors point to the growing number of leaders who are taking this path. P&G, General Mills, and General Electric are just a few of the names you'll recognize. Once people get past the not-invented-here mentality, the authors argue, it's amazing what can be accomplished by welcoming outside expertise to the party.

Innovating in the supply chain space does not take a spark of genius—though that certainly can't hurt if you're lucky enough to be on the receiving end of a jolt. Rather, it takes a mindset that is curious enough to wonder whether the way we've been doing things can be done better. True innovators, of course, don't stop with idle curiosity. When they identify a new and improved approach to a supply chain job—regardless of how non-traditional that approach may seem—they then pursue the implementation process with a passion.

Climbing out of that conventional box has an important side benefit, too: It's good exercise.



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InSIGHTS

BY LARRY LAPIDE

Making the Software Business Case

In making a strong business case for supply chain software, it pays to focus on three categories of benefits: efficiency, asset utilization, and customer response.

I've had a career that included jobs in six professions: marketing consultant, high-tech marketing manager, supply chain consultant, software analyst, academic researcher, and part-time college lecturer. Looking back, the job I enjoyed most was as a software analyst at AMR Research (now part of Gartner) from 1998 to 2003. It was a challenging job because as the Chinese curse goes: "I lived in interesting times." Yet I've always viewed living in interesting times to be a blessing.

The Evolution of SCM Software

My tenure as an analyst was during the phenomenal growth of supply chain management (SCM) as a discipline. The Supply Chain Council was formed during that period and introduced its Supply Chain Operations Reference (SCOR) model. The model's iconic logo depicted an integrating Plan arrow atop three process arrows—Source, Make, and Deliver—aligned below. It represented what companies should be doing to integrate their logistical functions (such as warehousing, transportation, and inventory management) with their manufacturing and procurement functions.

During that same period, a marketing war erupted between two software vendors, Manugistics and i2 Technologies, that turbocharged technology innovation throughout the supply chain software industry. The vendors were aggressively selling applications, riding the wave of interest in SCM. Companies were purchasing software to enable integrated supply chain processes, and million-dollar software implementation deals were common. This got the attention of the Enterprise Resource Planning (ERP) software vendors (such as SAP and Oracle), who decided to market SCM software as well. At first they tried to partner with "best of breeds" like Manugistics and i2, but afterwards decided to develop their own solutions or buy companies offering the functionality.

That time period, which lasted until the Internet bubble burst, saw a lot of innovation. By 2002 the SCM software market was littered with hundreds of best-of-breed vendors as well as the ERP vendors. Since then, the market has consolidated dramatically.

Convincing Business Cases Needed

Given the market's complexity, users were frequently asking AMR to help them understand what each software vendor offered. Since implementing software (in and of itself) is not particularly useful unless it enables a process that improves business performance, our basic advice hinged upon the answer to the following question: What is the business case for the process changes that the software will be enabling? Addressing that question entailed an analysis of the costs and benefits accrued over the life of the particular software.

The business case for SCM software, especially planning systems, needed to be even more convincing than that for ERP software. I learned this from i2 Technologies' co-founder, Sanjiv Sidhu, who believed that users considered planning software to be "Phase 2 or maybe Phase 3" software. Companies prefer to first implement transactional systems—the Phase 1 systems such as ERP systems including accounting, MRP and order management

functionality —followed by execution systems such as transportation and warehouse management. They tend to implement planning functionality last, and only if a very convincing business case can be made. The business case for planning software oftentimes involves estimating softer, less-tangible benefits that are derived from improved decision-making, rather than simply from more efficient operations.

I further learned that companies were able to justify implementing ERP software with marginal business cases because these systems impacted large swathes of enterprise-wide employees. For example, if a company was considering spending $10 million on an ERP implementation that supported 10,000 employees, that translates to a cost of $1,000 per employee or "seat." However, that same company considering implementing a $1 million forecasting or supply chain planning system that would be used by only 25 employees or less would incur a cost of $40,000 or more per seat. Most organizations would think long and hard about such an investment. A common reaction was: "That's a lot more money to spend just to support employees in making better decisions." Thus, the software needs to offer clear and significant benefits—demonstrated by a strong business case, as we discuss below.

The Software Business Case

While at AMR, I was briefed by countless software vendors. The briefings covered the software being marketed, its functionality, and case studies of the benefits achieved by implementation. Benefits were often stated in terms of operating cost savings, increased fill rates, and inventory reductions.

I once discussed these advantages with managers from the consumer packaged goods (CPG) industry and several of them told me that I was missing an important type of benefit: increased asset utilization. They claimed they were able to justify implementing planning software because it scheduled operations so efficiently that production increased to such an extent that their company deferred building a new plant. This benefit, deferring capital expense, is especially important in capital-intensive industries.

After that discussion, I revised my list of major benefits that might result from software implementations, as follows:

Efficiency
- Cost-of Goods (COG) savings
- Operating cost savings
- Productivity improvements

Asset Utilization
- Increased plant and warehouse use and throughput
- Inventory reductions
- Deferred capital expenditures

Customer Response
- Improved cycle times and Perfect Order fulfillment
- Greater customer satisfaction
- Resulting revenue and market share enhancements

(Note: Readers of my November 2008 *SCMR* column, "The Operational Performance Triangles", might recognize the types as the points of the triangles that depict the alignment of balanced operational performance objectives to corporate strategy.)

The business case for SCM software, especially planning systems, needs to be even more convincing than that for ERP software.

Software functionality enables process improvements leading to one or more of these benefits. Consider a Warehouse Management System (WMS) integrated with an Inventory Management System (IMS). These might be implemented primarily for the sake of efficiency, such as to reduce operating costs and improve productivity. However, customer response benefits might accrue as well, such as less order-splitting, shortened cycle times, and improved Perfect Order performance. In addition, asset utilization benefits might include deferring the need to expand storage space and reduce the use of overflow warehousing. Also, enabling dynamic distribution techniques, such as cross-docking, direct store delivery (DSD), and differentiated product flows, could negate having to build a new distribution center.

I found that making the business case for planning systems is trickier. Reason: the potential impacts of the planning system—both positive and negative—permeate the entire supply chain. These impacts must be carefully analyzed in the business case. For example, the business case needs to consider the trade-off between improved customer response resulting from the new planning system and any attendant increase in costs and inventories.

While I've focused on a list of benefits to consider during the development of a software business case, the list is the same whether software is involved or not. So if you want to develop winning business cases, make sure to estimate all potential operational performance impacts (both positive and negative) in order to pitch a complete, enterprise-wide story to your executive team.

BY PATRICK BURNSON

Major Growth Predicted for U.S. Manufacturing

Recent reports suggest that manufactured exports are set to surge. Combined with jobs created as a result of reshoring, higher U.S. exports will have a profound impact on supply chain managers in the years ahead.

Patrick Burnson is the executive editor at *Supply Chain Management Review.* He welcomes comments on his columns at pburnson@peerlessmedia.com

According to new research by the Boston Consulting Group (BCG), the export manufacturing sector has been the "unsung hero" of the U.S. economy. Harold L. Sirkin, a BCG senior partner and coauthor of the research, maintains that this is only the beginning. Sirkin believes that the United States is becoming one of the lowest-cost producers of the developed world—and companies in Europe and Japan are taking notice.

BCG projects that by around 2015, the U.S. will have an export cost advantage of 5 percent to 25 percent over Germany, Italy, France, the U.K., and Japan across a range of industries.

Among the biggest drivers of this advantage will be the costs of labor, natural gas, and electricity. As a result, the U.S. could capture 2 percent to 4 percent of exports from the four European countries and 3 percent to 7 percent from Japan by the end of the decade.

This would translate into as much as $90 billion in additional U.S. exports per year, according to BCG's analysis. When the increase in U.S. exports to the rest of the world is included, annual gains could reach $130 billion. BCG forecasts that the biggest export gains will be in machinery, transportation equipment, electrical equipment and appliances, and chemicals.

The analysis is part of BCG's ongoing "Made in America, Again" series, which has been reporting on how changing global economics are starting to favor manufacturing in the United States. This latest research delves deeply into the nation's competitive position relative to other developed economies. Together, the developed economies account for about 60 percent of global manufactured exports.

U.S. as an Export Base

Previous reports in this series have focused on production and jobs that are likely to be brought back to the U.S. as China's once-formidable cost advantage erodes. Earlier this year, a BCG report titled "U.S. Manufacturing Nears the Tipping Point: Which Industries, Why, and How Much?" predicted that the U.S. would gain 2 million to 3 million jobs from higher exports and production work shifting from China to the U.S. Although the reshoring trend (also referred to as "insourcing" and "onshoring") is still in its early stages, several large foreign manufacturers have already announced plans to use the U.S. as an export base for other markets.

Toyota, for example, has announced that it will export Camry sedans assembled in Kentucky and Sienna minivans made in Indiana to South Korea, while Honda and Nissan both say that they expect to boost exports of vehicles made in their U.S. plants to the rest of the world. Siemens is building gas turbines in North Carolina to ship to Saudi Arabia for construction of a 4-gigawatt power plant. Rolls-Royce recently opened a new aircraft engine parts manufacturing facility in Virginia citing lower labor costs and productivity and "dollarization" (doing business in U.S. dollars to mitigate local currency risk).

Michael Zinser, a BCG partner who leads

the firm's manufacturing work in the Americas, notes that producing in the U.S. offers increasingly compelling cost advantages—not only in supplying North America but also some of the most important overseas markets.

BCG estimates that average manufacturing costs in 2015 will be 8 percent lower in the U.S. than in the U.K., 15 percent lower than in both Germany and France, 21 percent lower than in Japan, and 23 percent lower than in Italy. Average manufacturing costs in China will still be 7 percent lower than those of the U.S. in 2015. But those costs do not include transportation, duties, and other expenses. And it is less than half of the advantage that China enjoyed a decade ago.

A Look at the High-Tech Sector

More evidence that supply chain managers should prepare for a global shift in demand is contained in the newly released survey titled "Change in the (Supply) Chain." This annual questionnaire, conducted by IDC Manufacturing Insights for UPS, targets U.S.-based senior-level supply chain decision makers in the high-tech/electronics industry. This year's findings suggest renewed confidence in the nation's exporting potential. Despite economic uncertainty at home and abroad, survey respondents were bullish, the researchers found.

Citing legislative changes and rising labor rates abroad as factors, 85 percent of U.S. high-tech executives believe the Obama administration's National Export Initiative goal to double exports by 2014 is either "very likely" or "somewhat likely" to be achieved. Two years ago, by comparison, the response rate for these two categories was only 40 percent.

The survey is designed to uncover top business and supply chain trends driving change in the high-tech/electronics industry. The 2012 survey focused specifically on exporting and was conducted in May through July of this year.

Among executives who believe the export goal is achievable, nearly one in three attribute this to the steady increase in disposable income in emerging markets. Another third cite rising labor rates in traditional low-cost manufacturing countries as a primary factor, and approximately one in five point to legislative changes such as recent free trade agreements in Asia. A large majority, 81 percent, of U.S. high-tech executives anticipate recent free trade agreements in Asia will increase their company's imports and exports to and from the region.

Although North America is expected to remain the largest high-tech consumer market over the next three to five years, demand for high-tech products is expected to decrease by 7 percent in the region while demand in other markets is expected to increase—in some regions by double-digit percentages.

Optimism Abounds

Executives who responded to the UPS survey report plans to increase sales/fulfillment in India, the Middle East and Africa by 22 percent each and in Brazil by 18 percent. Sales/fulfillment in other South American regions is expected to increase 19 percent. Eastern Europe (15 percent), Korea (13 percent), China (8 percent), and other Asian nations (8 percent) also rank on the list of top high-tech consumer demand markets.

A large majority of U.S. high-tech executives anticipate recent free trade agreements in Asia will increase their company's imports and exports to and from the region.

Most surprising is the sizable increase in optimism around the 2014 U.S. export goal. Not only do 85 percent believe the goal is ultimately attainable, but 21 percent believe it is "very likely" to be achieved. In addition, fully three quarters of the high-tech executives surveyed expect to see growth in the export of their company's specific products within the next two years.

When asked why they anticipate global trade growth, 81 percent of the respondents cite free trade agreements in Asia as a key factor. They also point to emerging market economies and their growing middle class with an ever-increasing appetite for technology products.

Assessing individual opportunities for international trade growth, only about one in four high-tech executives believe their company's import/export capabilities are best-in-class and 72 percent report that opportunities for improvement exist.

Supply chain costs (72 percent), lead times (40 percent), and responsiveness (18 percent) rank as the top three drivers of change in the high-tech supply chain in the next three to five years. Nearly half, 48 percent, of high-tech executives cite extended lead times as one of the top three pain points in the import/export process. This was followed by managing inventory (42 percent) and end-to-end visibility (38 percent). Unstable suppliers and intellectual property protection are close on the list of pain points, with 37 percent and 30 percent of executives respectively citing these as issues.

While this edition of *SCMR* went to press before the U.S. presidential election results were in, it appears that the Obama export initiatives will remain in place. Supply chain managers should prepare themselves accordingly.

TALeNT STRATeGIES

Do You Have the Right Toolkit?

By Chris Caplice

Dr. Chris Caplice is the Executive Director of MIT Center for Transportation & Logistics. He can be contacted at caplice@mit.edu.

As a supply chain leader you have probably devoted a lot of time and resources to making sure that you recruit, develop, and retain the right talent. Sometimes, though, even with these efforts the overall team performance might not meet your expectations. At these times, it might be worthwhile for you to look at the software tools your team is using.

The degree to which team members accept, understand, and trust their supporting software tools can determine how much value they get from these solutions.

The interface between people and technology is an often-overlooked component of talent management programs. Yet these issues are becoming even more important in today's working environment. Most supply chain professionals will be expected to be comfortable and conversant with at least a handful of various supporting software systems, ranging from optimization-based decision support systems to pure transaction processing engines to massive data warehouses.

At a recent roundtable convened by the MIT Center for Transportation & Logistics (MIT CTL), more than two dozen organizations, including shippers, carriers, logistics services providers, and software vendors, discussed the growing impact of the "people side" of software tools—and the need for fresh thinking in this area.

Sources of Conflict

The industry has "suffered tremendously from a horrible lack of focus on usability," said a senior executive from a supply chain software vendor. Often it is assumed that "jamming everything though a web browser interface is an improvement," he added, which may be good for vendors, but not users.

The software executive suggested that over the last decade or so scant attention has been paid to how users interact with applications, with one notable exception—Apple. The company has refocused attention on building a blend of usability and fun into applications with its innovative tablet products.

A senior supply chain professional from a consumer products company said the fact that he has to check what software products a job candidate has mastered when looking at his or her resume is a sign that usability is a problem. Practitioners should be able to use any of the tools that are in common use across the industry within their functional domain, he maintained. It is like having to license teenagers how to drive differently for each model and make of cars.

There are a number of reasons for this apparent disjoint between supply chain software users and designers. Here are some that came up at the roundtable.

Increasing complexity. This is what one vendor called an "arms race" where so many features are added to software products that they become hopelessly unwieldy. Vendors are guilty of this race towards complexity, but so are buyers. A vendor pointed out that some solutions reflect the demands of requests for proposals that contain everyone's pet feature. Some of these requirements can be in conflict.

The trust factor. Black-box software products that are oversold without due consultation with users are often mistrusted. In such situations, staff members may use the software only when absolutely necessary, and have little faith in the output. The experience of a top freight carrier appears to be typical. A distribution optimization package delivered results that were beyond what the company's seasoned operators had seen. Although the solution was extremely cost-effective "they turned it off and set it aside." The central issue from the staff's perspective: "I can't see it so I don't trust it."

Too IT-focused. A leading shipper of food products

complained that software vendors tend to be closeted with the IT folks, and do not spend enough time with the operational people who use their products. On the other side of the fence, a vendor observed that they are often "corralled" into meetings with IT and don't get a chance to meet with operations.

Workforce attrition. High staff turnover rates make it more difficult to ensure that software tools are user-friendly. Individuals may not have enough time to learn how to fully utilize the tools, and constant churn puts more pressure on training programs. A number of professionals pointed out that this problem is getting worse because younger workers tend to move jobs more frequently.

Skills mismatch. The mix of tools might be wrong for a particular position, suggested one shipper. Legacy software, for example, may no longer be a good fit for certain applications, or not enough attention has been paid to adapting the software to job specifications.

Ways to Ensure Alignment

A number of companies offered ways to ensure that software solutions are aligned with the skills of workers and vice-versa. A major consumer products company swaps personnel with its primary supply chain software vendor, for example. By giving personnel temporary assignments in respective organizations, the requirements of both buyer and seller are built into solutions.

Another approach is to introduce new applications in a systematic fashion. A freight carrier has developed a process based on four steps: visualize the application that is needed, interact with users to refine the concept, build the "smarts" into the solution, and, only then, introduce automation. The idea is to enable individuals to visualize what the application achieves first, rather than developing technology designed to solve a problem and then pushing it out into the workforce. The "smarts" are added after users have provided input and understand the new offering, and not the other way around.

Peer-to-peer communications helps staff members to learn from each other and to use software tools more effectively, suggested a leading shipper. By this he does not mean e-mail—regarded as too slow by many companies—but more immediate channels such as internal texting networks. Having peer-to-peer communication capabilities within an application will not only improve the individual user's skills, but also make that application more central to their everyday work process.

A Visual Future

The next generation of talent will require different approaches to developing and introducing tools that make the best of their skills and expertise.

Both developers and users of software need to learn from the computer gaming industry (as Apple has done) if tomorrow's applications are to engage game-obsessed workers of the future. One vendor described this as the "game-ification" of software that utilizes sophisticated imagery to make applications "fun" and not something that is feared and/or mistrusted.

A now-familiar form of visualization is mapping. However, as a 3PL pointed out, currently these representations are used mainly to help sell products rather than to redefine how they are designed. One software vendor noted that sometimes mapping functionality is more like "executainment," designed more to impress senior management than as a useful management tool.

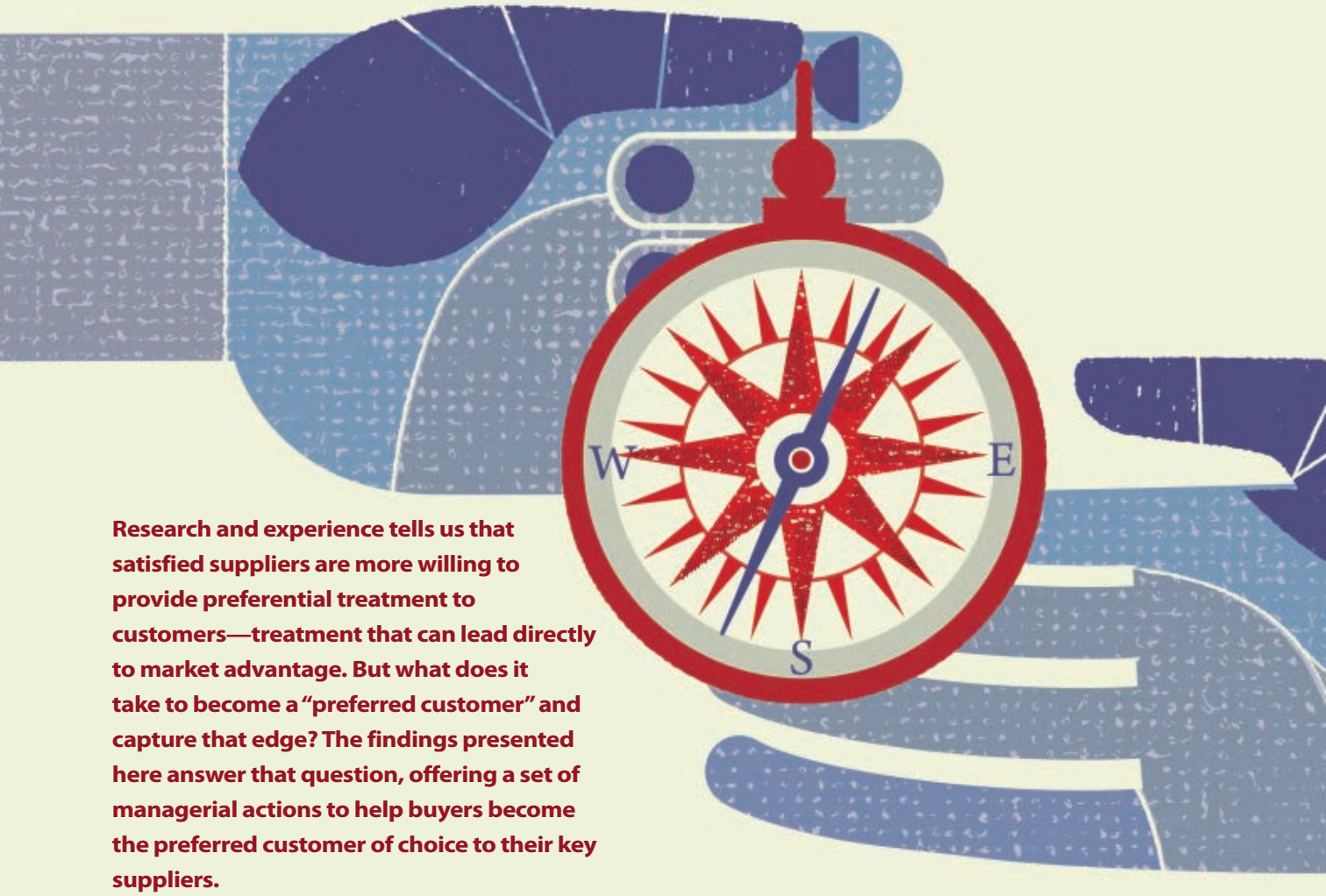
The next generation of talent will require different approaches to developing and introducing tools that make the best of their skills and expertise.

This is likely to change. Displaying information through innovative visual mappings is a way to help workers make sense of the flood of data they are now exposed to. And as several companies suggested, mapping the supply chain can reveal perspectives and features that are not visible using more traditional, numeric analyses.

Take, for example, the Hi-Viz Supply Chain research project headed by Dr. Bruce Arntzen, Senior Research Director, MIT CTL. The project is developing an advanced supply chain visualization system that toggles between geographic, bill-of-material, and other views in order to better identify hidden connections and potential ripple effects in the case of disruptions. During the course of the work, the researchers found that the actual location of manufacturing facilities is not readily available in existing, searchable company databases such as purchase order files.

Research is also underway to improve the interface between software and users. A recent study that involved the MIT Humanitarian Response Lab, for instance, looked at how people make decisions in disaster response situations, with the aim of building better tools that augment human capabilities. The field of "behavioral operations" is attracting more interest in academia, according to Dr. Jarrod Goentzel, the lab's director.

In addition to overcoming workers' resistance to software solutions and providing tools that enhance their skills and intuitive capabilities, these user-friendly applications could establish a positive feedback loop that leads to further innovations. As one vendor noted, "it's self-improving, because when someone engages with a tool, then they want to extend and improve it."



Research and experience tells us that satisfied suppliers are more willing to provide preferential treatment to customers—treatment that can lead directly to market advantage. But what does it take to become a "preferred customer" and capture that edge? The findings presented here answer that question, offering a set of managerial actions to help buyers become the preferred customer of choice to their key suppliers.

By Robert J. Trent and Zach G. Zacharia

Dr. Robert J. Trent (rjt2@lehigh.edu) is Supply Chain Management Program Director at Lehigh University and co-director of the school's Center for Value Chain Research. Dr. Zach G. Zacharia is an Assistant Professor of Management in the College of Business and Economics at Lehigh. He can be reached at zgz208@lehigh.edu.

The one constant that executive leaders will always face is a relentless pressure to improve corporate performance. Enlightened leaders understand that the link between positive relationships with suppliers and improved corporate performance is a strengthening rather than weakening one. And, these leaders understand that by satisfying the diverse needs of their suppliers, their firm stands a better chance of receiving preferential treatment from suppliers compared with firms with less satisfied suppliers. Consider the following high-profile examples.

Ford and Toyota are competing to become market leaders in the production of hybrid vehicles. As part of their development efforts both companies outsourced the production of a complex hybrid transmission system to the same supplier. As market demand for hybrid vehicles increased, Ford executives complained publicly that the transmission supplier favored Toyota when supplying transmission systems.[1] Unfortunately, a demand for transmissions that exceeds the supply of transmissions prohibits the supplier from supporting the demands of both

The wisdom of becoming *a* PREFERRED CUSTOMER

Gillian Blease

companies. What should be obvious here is that one company became the preferred customer while the other did not.

In another example that gained widespread attention, Airbus publicly accused General Electric of favoring Boeing during the development of engine technology for the next generation of commercial airplanes, a market estimated to be worth several hundred billion dollars.[2] As an Airbus executive complained: "The problem we have with GE is they go to Boeing and say 'what kind of engine should we design for your airframe?' Then they come to Airbus and say 'here is the kind of airframe you need to build to fit our engine.'" Complicating matters is the fact that the largest version of Airbus' next generation of planes will compete with the largest version of a Boeing model (the 777) where GE is the exclusive engine supplier. GE officials say they will not build a new engine for an Airbus plane that will compete against a Boeing plane where GE is the sole supplier.

These two examples highlight the high-stakes competition that is taking place over who will reap the benefits of preferential treatment from suppliers—a competition that can affect success or failure at the business level. Although the examples just presented involve large, well-known companies, the need to understand what it takes to become a preferred customer is just as critical for smaller and less well-known companies. Smaller companies must not be caught off-guard regarding what they must do to receive preferential treatment from suppliers. Failure to understand this can lead to some serious negative consequences as suppliers explicitly and tacitly decide who their preferred customers are. Because supplier satisfaction with a buying customer is primarily a function of a customer's behavior and not size (something that will be explained shortly), smaller companies do not have to be at a disadvantage here.

Operating from the premise that satisfied suppliers are more willing to provide preferential treatment to their most favored customers, we present a set of findings from two studies that examine what it takes to become a preferred customer to suppliers. We also translate these findings into a set of managerial actions that will help ensure an industrial buyer becomes the preferred customer to its suppliers.[3]

The Supplier Satisfaction Study

The findings presented here are the result of data collected using a detailed survey called the *Supplier Satisfaction Survey*.[4] This survey is a reverse scorecard where suppliers evaluate and score a specific customer rather than the customer evaluating and scoring a supplier, which is traditionally the case in buyer-seller relationships.

The supplier satisfaction survey is divided into sections that explore different aspects of the supplier's perception of a specific customer.[5] We conducted separate supplier satisfaction studies on behalf of two major buying or customer companies. As researchers, we had complete responsibility for administering the survey to ensure the confidentiality of supplier responses and to create an environment where suppliers could freely answer questions. We were also responsible for all communications with suppliers throughout the duration of

the studies. The following describes the two companies and their suppliers.

Company A: Transportation Equipment Manufacturer

Company A, a wholly owned subsidiary of a European company, is a regional producer of large transportation equipment headquartered in the U.S. Its industry is characterized by intense competition and year-after-year downward pricing pressures. Supply executives at this company identified 131 suppliers that were judged to be critical to this company's success.

Supplier satisfaction relates directly to a customer's performance and behavior, rather than demographic or other attributes.

After identifying these suppliers, the research team forwarded an electronic invitation to an executive at each supplier requesting their participation in the study. This invitation included a letter from a vice president at Company A that identified the objectives of the study, introduced the suppliers to the research team, and requested the names of internal participants who could provide detailed information about that supplier's relationship with this customer. Of the 131 suppliers contacted by the research team, 113 suppliers participated in the study, yielding a response rate of over 86 percent.

Just over 75 percent of Company A's responding suppliers are headquartered in the U.S., 13 percent are headquartered in Western Europe, and the remaining suppliers are primarily Canadian and Mexican. Even though a portion of participating suppliers are headquartered outside the United States, 90 percent of survey respondents have a facility or facilities located in the U.S. that supports Company A.

Just under half of the suppliers in the Company A study have sales of $50 million or less annually while almost 30 percent of suppliers have sales over $500 million. The suppliers in this study are, for the most part, smaller to medium-sized firms, particularly when compared with the buying customer. Every supplier in this study provided direct materials that are assembled into the customer's final product.

Company B: Raw Materials Producer

Company B, also headquartered in the U.S., has facilities and suppliers located throughout the world. Its products include raw materials that are produced and consumed essentially the same way globally by customers in almost every major industry. This company also has a significant marketing and sales presence in all major regions of the world. Company B is recognized as a global leader.

As with Company A, supply executives identified suppliers that are critical to Company B's success. The research team sent an electronic invitation to an executive at each supplier requesting their participation. This invitation also included a letter from a vice president at Company B that introduced the supplier to the research. Of the 180 suppliers contacted by the research team, 131 completed the survey, yielding a response rate of 73 percent.

Almost 60 percent of Company B's participating suppliers are headquartered in the U.S., 23 percent are headquartered in Western Europe, and 12 percent are headquartered in China. The remaining suppliers are from countries such as Canada and South Korea. Overall, Company B's suppliers are more geographically dispersed when compared with Company A's suppliers.

Company B's suppliers are also larger in terms of sales compared with Company A's suppliers. Almost 40 percent of Company B's suppliers have sales over $1 billion annually, indicating that Company B deals with suppliers that are relatively large. Over 20 percent of Company B's suppliers have sales greater than $5 billion per year.

While Company A's participating suppliers are manufacturing firms providing direct materials, 75 percent of Company B's suppliers are evenly distributed among chemical, service, and industrial capital equipment providers. The remaining 25 percent of suppliers are distributed among MRO, corporate, and energy suppliers. Company B, unlike Company A, has no direct materials suppliers it is a raw material producer.

Exhibit 1 compares the two companies and their suppliers. Across every dimension these two companies share almost nothing in common. These companies are even perceived differently in terms of their aggregate performance rating provided by their suppliers. As part of the research protocol we selected two very different companies, industries, and sets of suppliers for analysis. The rationale is that if a research finding applies across two very dissimilar settings, then one could conclude inductively that the finding is robust and that it should apply to other industrial settings. The next section identifies common research findings between the two sets of suppliers and studies that should be externally generalizable to almost any industry.

EXHIBIT 1

A Comparison of Two Companies with Minimal Similarity

	Company A	Company B
Type of Company	Manufacturer of large transportation equipment	Producer of raw materials
Geographic Scope of Company Operations and Industry	Almost entirely North American; company is one of six players in a regional industry	Operations in over 50 countries; industry features three major players globally
Geographic Scope of Company Sales	Almost entirely North American	Global
Participating Suppliers In the Study	Participants are all manufacturers; only direct material suppliers participated	All categories of suppliers participated; company uses no direct material suppliers
Size of Suppliers	Relatively smaller compared with the buying customer or Company B's suppliers	Relatively larger; suppliers are sometimes larger than the buying customer
Location of Suppliers	Mostly U.S. based; almost all suppliers have North American facilities that deal directly with this customer	Almost half of participating suppliers are located outside the U.S.
Supplier Rating of Customer	A composite performance rating of the customer by suppliers is relatively low (63/100)	A composite performance rating of the customer by suppliers is relatively high (78/100)

A Set of Robust Findings

Taken individually, the two satisfaction studies produce dozens of findings that are unique to each industrial customer's relationship with its own suppliers. But that is not what interests us here. Even though the two companies, suppliers, and even their industries are vastly different, a set of findings common to both companies emerges when comparing the results from the two studies. These findings help us better understand what it takes to be the customer of choice. The following identifies a set of findings that are consistent across these two very diverse sets of suppliers.

Supplier satisfaction relates directly to a customer's performance and behavior, rather than demographic or other attributes.

This is perhaps the major finding from the two studies. In both studies, supplier satisfaction correlates significantly with factors that relate to a customer's behavior toward the supplier (i.e., pay on time, share relevant information, treat suppliers ethically, and so forth) rather than demographic or other factors such as supplier size or the size of a contract. Interestingly, a negative although not a strong correlation exists in both studies between the total years a supplier has worked with the customer and lower satisfaction with that customer. That is, as a supplier works with a customer for longer periods of time, the probability increases that the supplier will indicate lower satisfaction with that customer across quite a few dimensions. Other research has also revealed declining satisfaction within industrial relationships as longevity increases.[6]

No statistical relationship exists between the size of a supplier in terms of sales and supplier satisfaction with the buying customer. In other words, supplier satisfaction with the customer is no different for smaller suppliers as compared with larger suppliers. Furthermore, no relationship exists between the size of the contract relative to the supplier's total sales and supplier satisfaction with the buying customer. Many companies offer progressively larger volumes to suppliers with the expectation that larger volumes will lead to more satisfied suppliers and better treatment. While that may happen to some degree, supplier satisfaction shows no statistical relationship with contract size. In both studies satisfaction relates directly to customer performance and behavior rather than the volume of sales that the customer represents. This is a welcome finding in that it suggests customers can change their behavior to improve supplier satisfaction, thereby leading to preferred customer benefits.

The relationship between supplier satisfaction and viewing a customer as preferred is extremely strong.

The strongest relationship between any variables in the two studies involves the level of a supplier's satisfaction with its customer and how that supplier views that customer. The correlation between supplier satisfaction and viewing the customer as preferred is .75 for Company A's suppliers and .73 for Company B's suppliers. Besides being virtually identical, these unusually strong indicators reveal a clear link between satisfaction and preferred customer status. (More advanced statistical modeling techniques conducted by the researchers confirmed this linkage). Even though we are dealing with two dramatically different sets of suppliers, the linkage between supplier satisfaction and viewing a customer as

preferred is strong and, even across two very different settings, almost identical.

A clear conclusion is that becoming a preferred customer will likely not occur if a supplier is dissatisfied with a buying customer. While these are not causal studies, logic would suggest a sequence where supplier satisfaction leads to preferred customer status. And, in both studies, a link between preferred customer status and a willingness by suppliers to provide preferential treatment is also clear, as we discuss below. The statistical linkages between supplier satisfaction, preferred customer status, and preferential treatment are unambiguous.

Suppliers indicate clear agreement regarding the customer performance attributes that are most important to them.

Suppliers rated quantitatively the importance to them of 25 attributes or behaviors that can be exhibited by their customer.[7] Exhibit 2 identifies the average importance rating of the top 15 items for Company A on a scale where 0 = not important to the supplier and 6 = very important. This exhibit also shows how the top 15 items for Company A compare to the average performance ranking by suppliers for Company B.

A major finding is that agreement exists from both studies regarding the four most important items to suppliers. After these four items the lists begin to diverge, sometimes dramatically, reflecting the differences between the two sets of suppliers. The items where the two supplier segments show convincing agreement about what they want from their customers include earning a fair financial return, receiving payment in a reasonable time, opportunities for longer-term business relationships, and ethical and respectful behavior. When supplier executives ask themselves what they want most from a customer, these four items will likely be at the top of most lists.

Satisfied suppliers are more willing to provide valuable kinds of preferential treatment to their preferred customers compared with less satisfied suppliers.

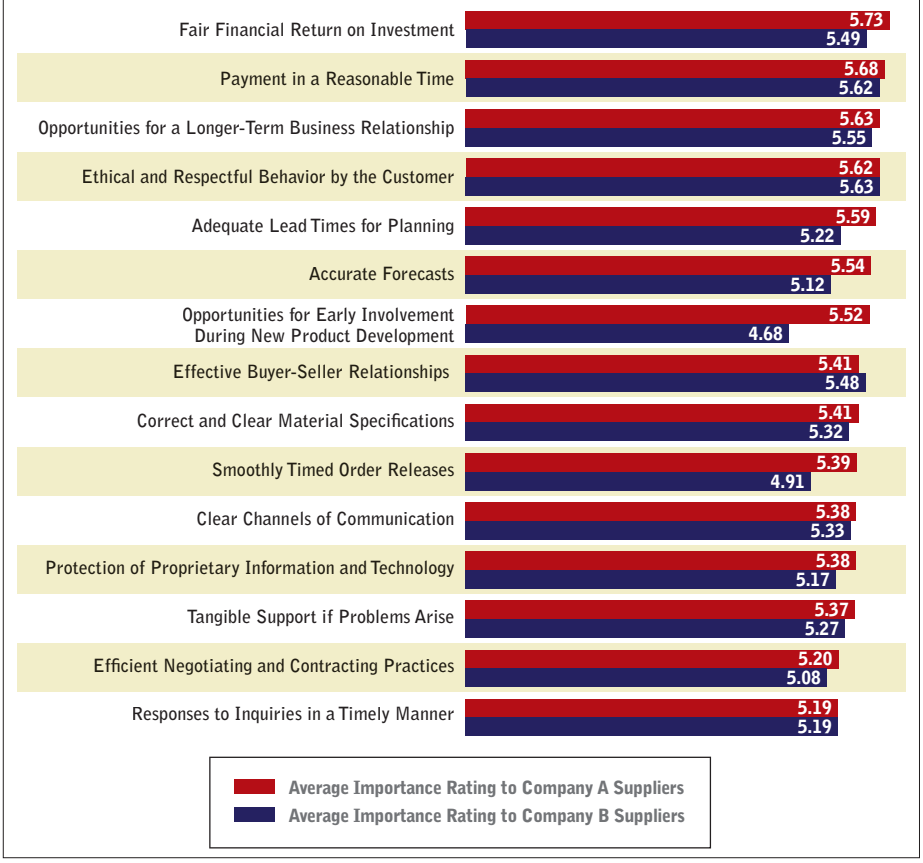
One of the central questions underlying this research is whether satisfied suppliers are willing to provide preferential treatment to their best customers. After all, if all of the time and energy committed to developing strong relationships does not lead to tangible benefits in the form of preferential treatment, then some might question the wisdom of directing scarce resources toward the development of supplier relationships in the first place.

This research examined a set of supplier-provided outcomes across three broad groups—supplier willingness to make direct investments that only benefit a specific or limited number of customers, supplier willingness to provide internally-developed innovation to a customer, and supplier willingness to provide certain types of favorable treatment to a customer. Exhibit 3 identifies the supplier-provided outcomes that suppliers can potentially

EXHIBIT 2

What Is Important to Suppliers as Provided by Buyers

0 = Not Important to the Supplier 3 = Somewhat Important to the Supplier 6 = Very Important to the Supplier



provide to their customers.

A direct relationship exists between supplier satisfaction with a customer and the willingness of that supplier to provide certain (and valuable) kinds of preferential treatment. Conversely, less satisfied suppliers are clear that they are unwilling to provide valuable kinds of preferential treatment when they are disappointed with that customer. This finding is consistent across both studies.

The three supplier-provided outcomes that the overall sample of suppliers are the least willing to provide Company A (from the total set of items presented in Exhibit 3) are direct financial support if needed, better pricing, and more favorable payment terms. Yet, the willingness to provide these items correlates the highest of all items with supplier satisfaction. In other words, as suppliers become increasingly satisfied with Company A, the more willing they are to provide these valuable kinds of preferential treatment.

The same phenomenon is observed with Company B's suppliers, although not as dramatically as with Company A. This is likely due to the widespread diversity of Company B's suppliers as compared with Company A's suppliers. Still, three of the four supplier-provided outcomes that correlate the highest with supplier satisfaction for Company B are also the lowest ranked in terms of the willingness to provide across the overall sample. These three items include preferential scheduling of orders, better pricing, and first allocation of output if capacity is constrained. Again, satisfied suppliers are more willing to provide valuable kinds of preferential treatment compared to less satisfied suppliers. Preferred customer status brings with it a set of outcomes that are not available to typical customers—benefits that can contribute to a hard-to-duplicate source of competitive advantage.

Satisfied suppliers are more willing to provide valuable kinds of preferential treatment to their preferred customers compared to less satisfied suppliers.

EXHIBIT 3

Types of Supplier-Provided Preferential Treatment

Supplier-Provided Direct Investment

- Capacity dedicated to the customer
- Personnel to work directly at the customer's facilities
- Engineers to support the customer's product design needs
- Investment in new equipment that benefits only the customer
- Exclusive use of new technology developed by the supplier
- Hold inventory to support the customer's needs
- Provide direct financial support if needed
- Create information technology systems unique to business with the customer

Supplier-Provided Innovation

- Product innovation
- Production process innovation
- Process innovation other than production processes

Supplier-Provided Favorable Treatment

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

There is a strong relationship between a supplier's satisfaction with a customer and the level of trust the supplier perceives exists within the relationship.

The findings from both studies reveal that trust is central to effective relationships and supplier satisfaction. This is consistent with other research that has focused on trust as a key element of relationship success. Our research reveals that higher levels of relationship trust directly link to supplier satisfaction.

Perhaps the most important predictor of a successful relationship, trust refers to the belief in the character, ability, strength, or truth of a party. The relationship between trust—which is widely considered an antecedent of effective relationships—and the quality of a buyer-seller relationship is well known. Perhaps most importantly, the presence of trust promotes the sharing of

information, which suppliers in both studies agree is a central component of an effective relationship.

The statistical relationship between trust and supplier satisfaction is one of the strongest relationships identified during this research. Across both supplier segments, a relatively strong correlation also exists between supplier satisfaction and the supplier's level of trust that their customer will do the right thing during business dealings. The statistical link between supplier satisfaction and various trust-based indicators is compelling. This topic is explored more thoroughly in the managerial implications section.

Suppliers agree strongly that customer personnel they deal with must be knowledgeable about the supplier's product, processes, business, and industry.

Satisfied suppliers are much more likely to view their relationship with their customer positively along a relationship continuum, perceive that the relationship has improved over the last three years, and expect the relationship to further improve.

Various models have been developed that provide logic to industrial relationships. Exhibit 4 presents the model of supply chain relationships used in this research.[8] This model features supply chain relationships ranging from counter-productive to collaborative. Suppliers in both studies are consistent in their belief that a higher level of satisfaction with their customer correlates strongly with the cooperative and even collaborative relationships featured in Exhibit 4. And, those suppliers that indicate higher levels of satisfaction with their customer tend to agree that their relationship with that customer has improved over the last several years and will continue to improve.

A direct statistical link exists between supplier satisfaction and relationships that are cooperative and even collaborative. Research results from both studies reveal clearly that satisfied suppliers are more likely to be engaged in a cooperative or collaborative relationship with their customer.

Suppliers agree strongly that it is critical for the customer personnel they deal with to be knowledgeable about the supplier's product, processes, business, and industry.

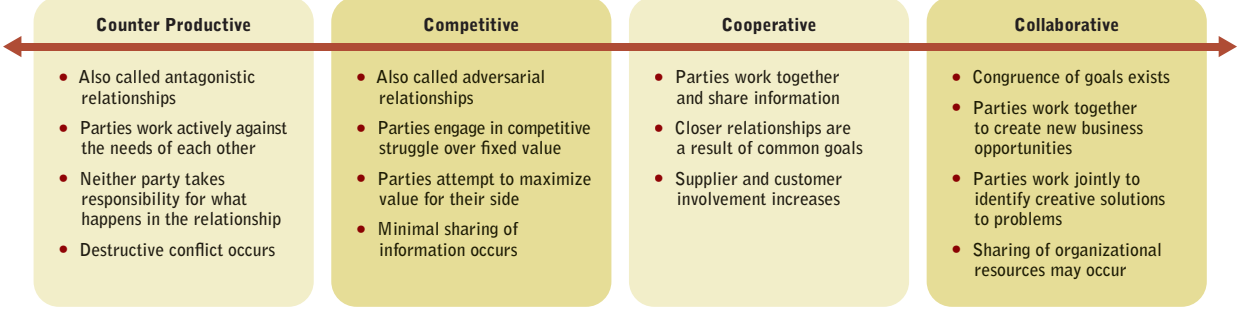
Almost every supplier in this research indicates that they have assigned an individual (such as an account manager) to be their primary contact with the customer. Furthermore, almost every supplier indicates that they are aware of a specific individual assigned by the customer who is responsible for managing the relationship. In both studies, over 90 percent of suppliers agree it is "very important" that the personnel they deal with directly at their customer are knowledgeable about the specifics of the supplier's product, processes, business, and industry. When tasking specific individuals with the responsibility for working with a supplier, it is not sufficient to simply assign an individual with that responsibility. In the eyes of suppliers that individual must also be highly qualified.

Managerial Implications: Call to Action

The findings presented here reveal a clear link between a customer's behavior, the satisfaction level a supplier has with that customer, and a supplier's willingness to provide preferential treatment that less satisfied suppliers are not willing to provide. The following builds on these findings by presenting a set of actions that will help a customer benefit from the kinds of preferential treatment that satisfied suppliers potentially offer.

EXHIBIT 4

Supplier-Buyer Relationship Continuum



Understand How Suppliers Perceive You as a Customer
Given the effort required to obtain the data, it should come as no surprise that relatively few buying customers truly understand how their suppliers perceive them as a customer. Yet, how else will a buying company be able to improve its relationships and receive preferential treatment from suppliers if it does not know where it is doing well and where it is falling short? Gaining this insight requires a commitment from the highest levels of the supply organization to solicit supplier-provided feedback. How is your company actually viewed in the eyes of your suppliers, particularly when those suppliers are offered the opportunity to provide unfiltered, objective responses? Shortly after the completion of the supplier satisfaction study, supply executives at Company B met to identify ways to incorporate the findings from the study into their strategic planning process. Objective feedback from suppliers influenced the strategic direction of the entire supply organization.

Pursue Trust-Based Relationships
The importance of trust within a buyer-seller relationship is a theme that permeates our research findings. Industrial customers can demonstrate their trustworthiness through open and frequent communication with suppliers, following through on promises and commitments, sharing relevant supply chain information, and acting legally and ethically in all business dealings. The importance of ethics and protecting proprietary information within a trust-based relationship is also a common theme across the two sets of suppliers in this research.

Trust-based relationships also feature these characteristics: the parties act on behalf of the relationship rather than self-interests; success stories and personal narratives are well publicized, especially those that enhance the standing of the other party; and information and data is treated confidentially. One outcome from a customer's relationship efforts should be the pursuit of activities that promote frequent contact, particularly because communication frequency and the level of trust within a relationship are highly correlated.

Recognize the Importance of Knowledgeable Personnel and a Stable Workforce
As we mentioned earlier, over 90 percent of suppliers agree it is "very important" that the personnel they deal with directly at their customer are knowledgeable. Although suppliers in both segments are in almost total agreement about this point, the two sets of suppliers differ widely in their perception about the knowledge of the personnel they deal with at their customer. Company A has a reputation for having inexperienced buyers and shifting supply personnel on a frequent basis, often as a response to employee turnover. Company B tends to have a more experienced and stable workforce. It is not too difficult to predict which company's personnel receive higher scores from suppliers.

Maintaining supply knowledge will be a challenge to supply organizations, for example, as the baby boomer generation exits the workforce. This exodus will require a set of talent management strategies that focus on acquiring and then retaining personnel with the right set of capabilities, including knowledge about how to manage critical supply chain relationships.

An important finding across the two supplier segments is a willingness of satisfied suppliers to share innovation with their preferred customers.

Avoid the Seven-Year Itch
A finding from both studies is that a large percentage of suppliers have an extended history of doing business with the customer. We've noted that the satisfaction suppliers have with their industrial customer (as well as many other study variables) tends to decline the longer the supplier has worked with that customer. The inflection point for this downward shift occurs around the seven-year point of the relationship. This shift could be due to complacency between the parties, a "wearing down" of the relationship as years of continuous improvement demands begin to affect the relationship, a shifting of personnel within the relationship, or myriad other reasons. The challenge becomes recognizing that this downward shift is a real possibility and then developing an action plan to reenergize the buyer-seller relationship.

Request Preferential Treatment
From this research we know that satisfied suppliers are willing to provide preferential treatment to their preferred customers. The challenge becomes one of understanding how to obtain that treatment. One way to address the subject of preferential treatment is during contract negotiations, particularly when crafting a supplier's statement of work. Another way is to address the

topic during annual review meetings with suppliers—meetings that suppliers in both studies rate as extremely valuable. Suppliers also indicate a strong willingness to engage in various forms of executive-to-executive interaction, another logical place to engage in discussions about special treatment. Progressive companies will also have established buyer-supplier councils that feature executive-level engagement between the customer and its key suppliers. Each of these suggestions offers the opportunity to discuss the possibility of preferential treatment.

Tap into Supplier Innovation

An important finding across the two supplier segments is a willingness of satisfied suppliers to share innovation with their preferred customers. Fortunately, a variety of ways exist to tap into that innovation. These include early supplier involvement during product and technology development, technology demonstration days where suppliers are encouraged to showcase their new ideas to engineers and supply personnel, and supplier participation on customer improvement teams. If innovation is the lifeblood of growth, then it becomes a competitive necessity to tap into sources of innovation wherever they exist. Tomorrow's market winners will be expansive in their pursuit of new sources of innovation.

Winning in a New Environment

Industrial buyers who pursue adversarial relationships with their most important suppliers will find today's competitive environment different than years past. Those companies that fail to develop positive relationships may find their suppliers allocating limited capacity to other firms, sharing their most innovative ideas with other customers, or exiting an industry segment altogether.

A commitment to stronger relationships and satisfied suppliers offers the potential to help meet the demands of a highly competitive marketplace. The challenge becomes one of satisfying, wherever possible, the central needs of a supply base so that suppliers view the buying company as a preferred customer. And, as our research shows, being the preferred customer offers advantages that are not as readily available to other customers—advantages that could lead to future competitive advantage.

The time is right for executive leaders to make the attainment of preferred customer status with suppliers a central corporate objective. In particular, two actions should happen right away. The first is to assemble an executive team to convey throughout an organization the intention of becoming a preferred customer to suppliers. Second, an initiative should commence to communicate this intention to the supply community with feedback requested. Solidifying a position as a preferred customer or pursuing that position in the first place can only occur when a buying company truly understands what suppliers think about their customer.

End notes

1 D. Welch and H. Tashiro, "Japan Takes New Bite Out of Detroit," *Business Week,* July 24, 2006.

2 D. Michaels and K. Kranhold, "Engine Spat Could Slow Airbus," *The Wall Street Journal*, July 10, 2007, sec. A, p. 10.

3 Some sources use the term "customer of choice" to describe preferred customers. The terms "customer of choice" and "preferred customer" are used interchangeably here.

4 *The Supplier Satisfaction Survey* is a proprietary tool developed by Robert J. Trent.

5 The survey includes questions pertaining to a supplier's beliefs about a specific industrial customer across a number of areas, including the customer's (1) importance to the supplier, (2) comparison to an ideal customer, (3) performance feedback provided, (4) ethical and business conduct, (5) knowledge and skills of employees, (6) responsiveness to supplier concerns or questions, (7) specified quality and delivery performance requirements, (8) business-to-business relationship with the supplier, (9) quotation, negotiation, and contracting practices, (10) future business opportunities and payment terms; and (11) supply chain information sharing and transaction efficiency.

6 See S. Jap and E. Anderson, "Testing a Life-Cycle Theory of Cooperative Interorganizational Relationships: Movement across Stages and Performance," *Management Science* 53, no. 2 (February 2007): 260-275; G. Bell, R. Oppenheimer, and A. Bastien, "Trust Deterioration in an International Buyer-Supplier Relationship," *Journal of Business Ethics* 36, no. ½ (March 2002): 65-78.

7 These 25 attributes or behaviors were identified through focus groups with suppliers and through other secondary research.

8 The scale used in the survey was 1 = Counter-Productive, 3 = Competitive, 5 = Cooperative, 7 = Collaborative.

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Supply Chain Visibility: MORE TRUST THAN

Achieving supply chain visibility has been an elusive quest for many companies. Simply throwing more data or technology at the problem has not seemed to work. What's needed instead is a structured approach that identifies the goals of enhanced supply chain visibility, narrows the scope of data required, and—most important of all—rests on a foundation of trust.

Robin Heighway-Bury

TECHNOLOGY

If there's one recurring bad dream that keeps supply chain executives awake at night, it might well be the seemingly impossible quest for better visibility. It's one of those classic nightmares where you keep grasping for something just out of reach. Even at companies with higher levels of collaboration in their supply chain, it seems that visibility is always "two years off."

The popular misconception that information technology is the underlying issue limiting data availability—and the resultant visibility—has prompted executives to seek solutions in IT. Given the sizable investments companies have made in IT to harvest supply chain data, the question of why visibility isn't better is a perplexing one. The "complete" view of inbound supply and outbound fulfillment sustained by seamless upstream and downstream connectivity that managers had been led to expect is proving to be a frustrating, ongoing work in progress. There's no shortage of technology solutions that purport to enable visibility. Yet getting timely, accurate information with which to run global operations—even after costly IT solutions are in place—remains a daunting challenge.

So if technology is not the bottleneck, then what is? The answer is that the nature of relationships is the primary constraint on what and how much information ultimately gets shared. The more trusting and collaborative the relationship, the more that data is shared and visibility improves; the less trusting and collaborative, the opposite holds true.

By Mike Giguere and Brad Householder

Mike Giguere and Brad Householder are principals in PwC's Advisory Practice, focusing on supply chain management. They can be reached respectively at mike.giguere@us.pwc.com and brad.householder@us.pwc.com.

Visibility's Link to Decision Making

The important thing to understand about visibility is that it is a means, not an end. The goal itself is collaboration—defined here as aligned decision making throughout the supply chain. Visibility is an enabler of this goal. Correspondingly, finding the right balance between the demand for visibility to make better decisions and the supply of data realistically available from your supply chain partners requires a reframing of the objectives of collaborative decision making, rather than simply a retooling of the technology. Just as not every supply chain relationship can fit the same model of collaboration, not every supply chain relationship can have the same level of visibility. There is a practical upper limit to what data supply chain partners can and will

Different categories of collaboration and collaborators generate different visibility requirements—and create different data constraints.

share, and *that limit is a characteristic of the nature of their collaborative relationship.*

Companies put a great deal of emphasis on characterizing their supply base for their purchased materials and services; likewise, they need to understand the characteristics of their supply base when it comes to supply chain data. They need to understand that different kinds of collaborative relationships impose different "upper limits" on data that will be freely shared. By taking into account these natural, practical limits to the kind of data that can be expected, companies at the same time position themselves to better manage the demand side of visibility. In particular, they are better able to ask the need-to-know questions consistent with the different priorities of respective partners and supply chains.

To repeat a main point made earlier, data abounds. That's not what's lacking. What is under-developed is the appropriate business focus to identify the most imperative results a company needs to ferret out from data. In parallel, the quickest route to improved returns on investment in visibility is to prioritize and narrow the scope of what you need to know. Don't get lost in data. Simply put, it takes asking the right questions to get the right answers.

In this context, visibility should be viewed as a specific tool to be used in moving up the "information pyramid" and converting data into useful information and knowledge. Inundated by data, supply chain leaders might well share the lament of poet T.S. Eliot in asking "where is the knowledge we have lost in information?"

Companies that successfully achieve an effective level of visibility do so by maximizing the knowledge creation out of the available data. In our terms, they have been able to strike the right balance between visibility demand and data supply. They have identified the critical decisions their supply chains need to make and then derived the necessary data input from their collaborative relationships to support that decision-making.

The big idea here is that different businesses have different supply chain imperatives that require visibility. For some, it is how to use data to properly forecast; for others, it is how to avoid leaking profitability by making the right choices in allocating capacity and materials; still others seek to establish options to respond to disruption. Just as no one size supply chain fits all, there's no one approach to visibility.

A New Perspective on Visibility

In determining the right approach for your organization, we advocate a new perspective on visibility. The first step is to recognize that visibility breakdown is typically an indicator of a more deep-seated problem of collaboration. Instead of being a technological failure, it is most often a failure of business strategy or alignment. Companies have been working on collaboration now for nearly two decades and, within that timeframe, have adequately addressed such things as standardization, governance, and even IT integration. Visibility, however, continues to remain a weak link largely because of collaboration issues.

The nature of supply chain relationships—be they characterized by terms like strategic partner, commodity supplier, one-to-many, or many-to-many—influences the levels of trust required to share data. A simple way to informally test the richness of probable information flow is to ask this question: When you and your collaborator share information with each other, are you expanding the total pool of mutual value or is it a zero-sum game? The answer is a strong predictor of the level of visibility with that collaborator. In cases where it is in the interest of all parties to exchange information, visibility abounds; but in instances where the mindset is "the more I share with you, the more value you capture from me," visibility suffers.

In short, different categories of collaboration and collaborators generate different visibility requirements—and create different data constraints. By their very nature, some collaborative relationships are predicated on such high levels of strategic inter-dependence that they mandate extensive information sharing. In relationships that are more transactional, on the other hand, the parties are much more guarded in what they will share. They are justifiably reluctant to expose too much about their operation lest they weaken their competitive position with other

vendors and customers. Bluntly put, it is the element of trust more than technology that determines the level of disclosure.

Working with external collaborators to share data beyond the enterprise walls is a challenging task. Partners want to keep certain key metrics—cost structure, capacity, timing, and volume transactions with competitors, for example—private. The universal question that even the largest companies struggle with can be put as follows: How much does my cooperation with you cost me in terms of my competitive position? As a general rule of thumb, the more partners in a supply chain, the less likely the unfettered flow of relevant visibility data.

Visibility initiatives that ignore how the trust factor affects information quality proceed at their own peril. When incomplete or defective data gets passed along, margins of error are compounded at successive stages and end up producing results that fall short of expectations. The conclusion from this is inescapable: if even under the most favorable scenarios visibility is inevitably going to be partial, it is imperative to focus on the right things. The related message to supply chain leaders is that they must be clear about what they need to see. Too often, however, such clarity of purpose is missing.

Rather than seeking 100 percent visibility, the goal should be to zero in on the most important issues being addressed by the supply chain as it aligns with corporate business strategy.

Techniques for Gaining Clarity

Being clear about the nature of the collaborative relationship helps clarify the kinds of visibility questions to ask. All suppliers, as we mentioned earlier, are not created equal. We recommend that companies apply a kind of taxonomy that organizes collaborators into one of three categories: strategic, tactical, and transactional. (For more on these segments, see sidebar "Taxonomy of Supply Chain Collaborators.") The distinctions are somewhat arbitrary and subject to change, but they do help define the kinds of visibility that is required from each category.

As organizing principles, these categories capture the

Taxonomy of Supply Chain Collaborators

Strategic collaborators are those partners in a supply chain which are closely aligned in their long-term business strategy and decision making. Together, both parties are making complimentary investments in technology, intellectual property, and new products. With each of the partners in this supply chain so directly relying on the performance of the other, maximum information sharing is desired and appropriate, and is so stipulated in governance agreements.

Partners working at this level have to be willing to take the relationship beyond one that simply comes back to price. To be sure, this is easier said than done. Even with the product co-development and investment sharing taking place, the lower-leverage partner in the relationship (say, the supplier) often ends up being treated like "the little brother" at annual contract negotiations and is asked to cut a hefty percentage off their prices. In such cases, it is easy to understand their reluctance to share product road maps and other competitively sensitive data since they are ultimately unable to capture adequate value.

Tactical or core collaborators are partners whose contributions are required to run the operations on a daily basis. Tactical suppliers can be replaced and are typically redundant; however, their failure to perform at expectation would still put stress on the buyer's operations. Visibility within this supplier segment is usually necessary to have an optimized and efficient supply chain. With tactical collaborators, factors such as cost, timely execution and delivery, and product quality need to be visible.

One caution: this is the segment in which the sharing of information often devolves into a zero-sum game in which one side wins and the other loses. Trust is required to avoid this outcome, but the situation can be problematic. The sharing of information is this segment can be facilitated, and its potential impact to cost mitigated, through operating agreements that link cost to external market factors as a means of minimizing one party's ability to capitalize on the information gain from the other.

Transactional collaborators constitute the vast majority of supply chain partners offering commodity or fungible goods. For transactional collaborators, the primary risk to be monitored is whether goods ordered at the price stipulated are delivered with reliable timing and quality. Visibility and the underlying information sharing are generally limited to basic supply and demand information necessary to support the reliable flow of current orders. Forward-looking information beyond the horizon of firm orders is often limited data related to quotation activity.

essential aspects of differentiated states of collaboration and allow for appropriately differentiated governance agreements, proactive measures of performance, and risk management efforts that "focus on the right things" from a visibility standpoint. Further, if you overlay your approach to supply chain or supplier risk using this approach, you can quickly zero in on those particular suppliers within those categories where visibility is critical and a high degree of information sharing is desirable.

Instead of being a technological failure, a breakdown in visibility is most often a failure of business strategy or alignment.

In addition to segmenting supply chain partners, another way to clarify visibility requirements is to identify the primary goals and vulnerabilities of specific supply chains and establish appropriate information-sharing processes. Differentiated strategies help to focus and prioritize the decisions to be made and, hence, the data required to make the best decisions. A low-cost supply chain, for example, will naturally seek to make different decisions across the supply chain from a high-service supply chain. A clear strategy applied to the extended supply chain is essential to prioritize decisions and information.

In some situations, the major supply chain concern is resilience and flexibility. Companies want to be able to see real-time options existing in their supply chain that will enable them to reply to disruption and to position themselves to be first in line to secure replacement stock. This requires visibility upstream into their suppliers' capacity and redundancies. High tech companies, dependent as they are on globally outsourced supply chains, have been leaders in achieving such effective multi-tier visibility. By exercising leverage over suppliers to negotiate favorable governance agreements that mandate extensive information sharing, these companies are able to continuously monitor the resiliency of their extended supply chain.

Benefits of Narrowing the Focus

Most companies don't have the bargaining power to oblige partners to provide information. Those that are not "800-pound gorillas" able to command compliance through the sheer size of their spend typically need to narrow and focus the scope of the targets for which they require high visibility levels.

The best way to tailor visibility in these cases is to narrow the focus of supply chain data to that required for the most critical decisions to be made. As an example, one manufacturer of commercial building materials was trying to improve its demand forecasting performance. The company's products could take on millions of possible permutations of color, form factor, length and base material. And yet their distributors and sales reps rarely had reliable information on demand at such detailed levels. This led to situations where they were consistently stocking out of certain grades of base materials, while swimming in excess inventories of other grades.

In an attempt to resolve this situation, the manufacturer embarked on a complex implementation of demand planning software that would take end-product sales—from the millions of permutations—and generate statistical baseline forecasts, then collect input from distributors and field sales to incorporate in the demand plan.

In this case, the data was certainly available, but the collection and crunching challenge was formidable. As the company got bogged down in the mire of the data challenges, it decided it needed to focus. In the end, the manufacturer made the key decision—which turned out to be the key profit driver for the business—to concentrate on buying the right grades of base stock (a long lead-time item) at the right times. There were less than 10 grades of base stock used, and the forecasts at this level were much more predictable and much simpler to calculate. Form factors, lengths, and colors were all short lead-time decisions that could be managed largely through flexibility of the supply chain. By focusing on the critical decision, and collaborating with its base material suppliers to synchronize purchases with the production campaigns for particular grades, the company was able to optimize its purchase quantities and timing while reducing expediting costs from their supplier.

Another example of narrowing the focus involved a specialty chemical company that processed non-petroleum based oils and resins into a wide variety of products for multiple end markets such as adhesives, coatings, food ingredients, and tires. A relatively small number of raw material inputs could be used to make a wide variety of end products. In addition, some of the raw material inputs had wide variations in their availability and costs.

Making the right decisions on diverting constrained or expensive raw and intermediate materials into the right end products, or even stockpiling them for bulk sale, was the critical factor in overall profitability. By focusing on the critical decision nodes in the purchasing and processing flow, the chemical company was able to

prioritize the data it needed from customers and suppliers, and, as importantly, the level of detail and the time horizons for the data. This focus greatly simplified the visibility challenge and streamlined and transformed the sales and operations planning process—from a cumbersome status review into a high-impact, profit-driven decision making engine.

In the End, It Comes Down to Trust

Ongoing conversations we have had with various executives suggest that many companies feel they are not getting the anticipated returns from their investments in supply chain visibility. The typical response to this perceived shortfall has been to seek more data-gathering capability. Yet this often fails to produce desired results. How does one balance the appetite for more visibility with the reality of inherent constraints?

We believe that the solution to this dilemma lies in reframing the quest. Rather than seeking 100 percent visibility, the goal should be to zero in on the most important issues being addressed by the supply chain as it aligns with corporate business strategy. Through this "less is more" approach, supply chain managers can get optimal visibility where it counts.

The key to achieving the right level of visibility is clarity around the supply chain objectives and the role different categories of collaborators play in achieving those objectives. The primary aim of a supply chain might be, for example, to maximize service and responsiveness, or to minimize cost, or to ensure resiliency and reliability of supply. Depending on the particular goal, different levels of collaboration and related metrics assume different levels of importance.

Most importantly, visibility needs to be addressed within the context of collaboration and governance. What presents itself as inadequate visibility is often caused by the reluctance of supply chain partners to fully trust each other with confidential information. This reluctance often is based on the suppliers' fear that they will incur unacceptable costs or weaken their competitive position. In order to provide high levels of visibility in the appropriate category, strong relationships must be established with suppliers responsible for providing mission-critical information.

Governance agreements with supply chain partners thus assume great importance.

Such information-sharing agreements should be tailored to the type of supplier— strategic, tactical, or transactional. Many companies make the error of assuming that their formal purchase agreements represent the extent of the governance agreement between the partners. While this may be the case for purely transactional, "many-to-many" type suppliers, it is not sufficient for higher levels of supply chain collaboration where a more comprehensive agreement is needed. Such a collaboration agreement goes well beyond the legal terms of purchase to form a joint service agreement governing the broader supply chain interactions of the partners. It would include specifics around key metrics and targets, bilateral data to be shared, exception management and escalation practices, and joint performance review provisions. Such agreements are a two-way street outlining the expectations for both of the partners.

Without that trust factor in place, the best governance agreements and tools will fail to yield the desired results.

In the fullest sense, visibility means more than simply knowing where materials reside in the supply chain. It encompasses a moment-in-time snapshot in which a wide range of business conditions are being measured. These include, for example, the effectiveness of forecasting processes, patterns of production and demand, risk factors, and the adequacy of inventory levels at acceptable cost. The company's circumstances and strategy will determine which of these measures demand top priority.

In summary, irrespective of the technology available between a supplier and a customer or the sophistication of the organizations, supply chain visibility ultimately boils down to balancing the level of trust between supply chain partners with the information sharing required to jointly execute on the priorities of the extended supply chain. Without the right focus and without that trust factor in place, the best governance agreements and tools will fail to yield the desired results.

Why *Working Capital* Should Matter to YOU

Working capital is one of the most powerful and least understood drivers for supply chain managers to improve a company's cash flow and profitability. In pursuing initiatives to achieve sustainable working capital improvements, supply chain managers need to look beyond their own organization. The best results are achieved when supply chain partners are embraced as well.

By Heimo Losbichler and Farzad Mahmoodi

Over the past few years, a global recession and tight credit markets have created a challenging environment for businesses in a variety of industries. Most recently, the uncertainties regarding the timing and the type of economic recovery have only added to the pressure. It is during such times that working capital management captures the attention of top management as the corporate goals shift from maximizing profits to securing liquidity. A 2010 Grant Thornton /World Trade survey confirms that optimizing working capital has been a top priority. Fully 90 percent of the survey respondents, who were in top management positions, reported taking some action to reduce their working capital.[1]

The Grant Thornton study also found that the most common approaches to reducing working capital were obtaining price concessions from suppliers and extending their payment terms rather

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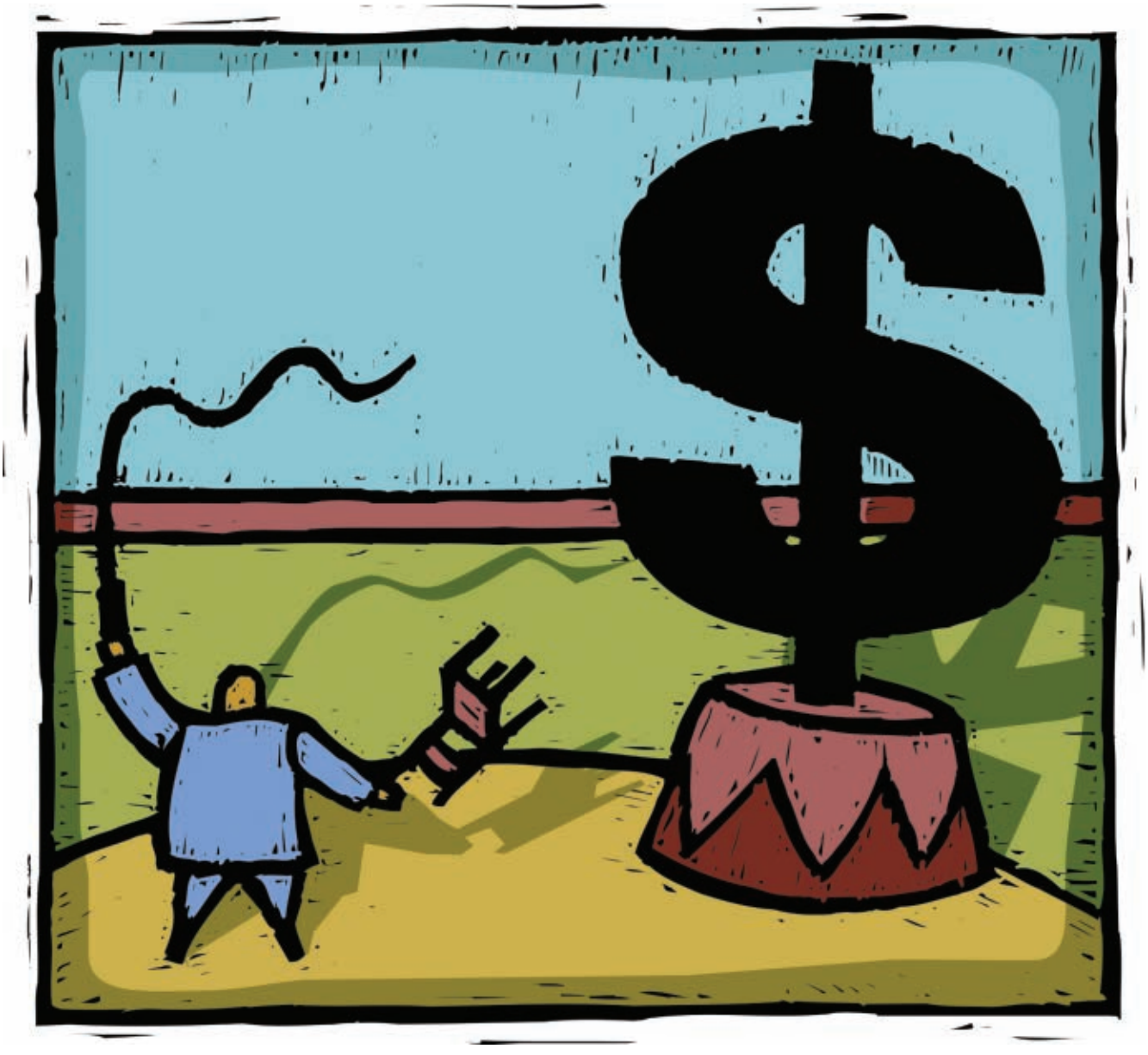


than investing in supply chain infrastructure improvements in such areas as warehousing, transportation, inventory management, and technology upgrades. Thus, it is evident that many companies that have successfully reduced their working capital may have done so at the expense of their supply chain partners.

It is widely acknowledged that effective supply chain management practices can reduce operating costs and logistics expenses, significantly impacting a company's working capital. The leading companies recognize this, but more importantly realize that sound supply chain practices can also achieve profitable growth. In striving to lower working capital, they pursue initiatives that will not only reduce their operating costs and improve profitability, but also benefit their supply chain partners.

This article will explain why working capital should matter to supply chain professionals. We begin by underscoring the impact that working capital has on financial performance and then discuss companies' overall progress to date in creating supply chain initiatives that positively impact working capital. The article then describes some of the limiting factors in working capital management and how supply chain managers can identify and overcome them. Finally, we offer some ideas on how supply chain managers can meet the working capital challenge going forward.

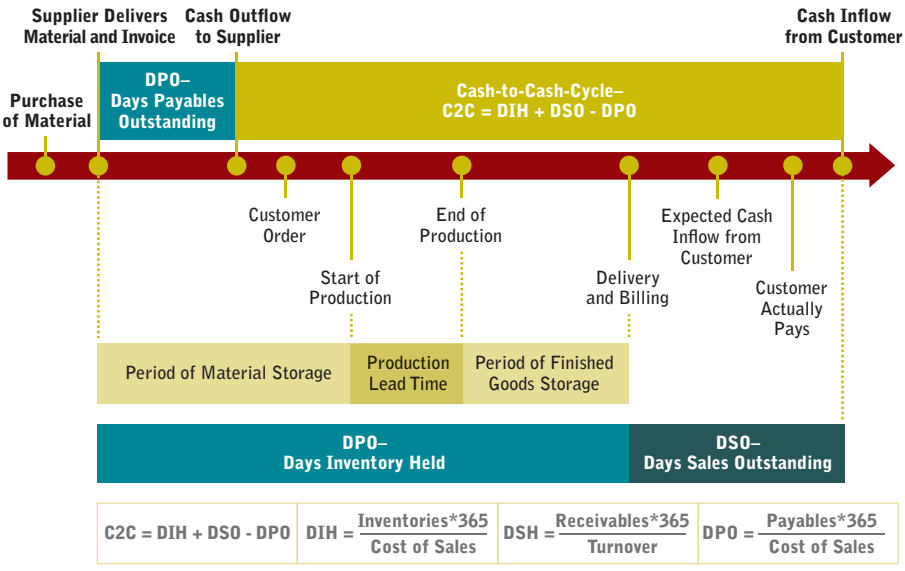
Working Capital's Impact on Financial Performance

From a supply chain management perspective, working capital is defined as the sum of inventories and customer receivables, less supplier liabilities, and is often

measured by the cash-to-cash (C2C) cycle time. The C2C cycle time is the average time required to turn a dollar invested in raw material into a dollar collected from customers. The C2C cycle time metric is the operative capital employed in days. It is calculated as days inventory held (DIH), plus days sales outstanding (DSO), minus days payment outstanding (DPO), as illustrated in Exhibit 1. If the C2C cycle time is short (or negative), the company is considered to be managing its working capital effectively. If the C2C cycle time is long, however, the company's capital is being tied up too long in business processes and thus cannot be used in other investments.

EXHIBIT 1

The Cash-to-Cash (C2C) Cycle Time Metric



A reduction in working capital has many positive effects. First and foremost is the release of liquidity that increases a company's cash flow. The impact can be significant. For example, reducing the C2C cycle time in 2010 by one day at IBM would have improved the company's cash flow by $1,578 million, as shown in Exhibit 2.

Importantly, the impact of the working capital reduction on financial performance goes far beyond the one-time release of cash. Reducing working capital also will have a permanent positive impact on profitability through lower capital investment in inventory. Add to this the positive impact on the operating costs tied up in inventory—that is, the non-capital carrying costs of storage, utilities, shrinkage, obsolescence, damage, insurance, taxes, and so forth. These costs are frequently not considered, even though such costs are generally estimated to be 10 percent of the amount of inventory per year.[2] In summary, lower inventory provides a double boost on profitability (lower cost and lower capital employed) and a double boost on cash flow (one-time effect of unfreezing assets and permanent lower operating expenses).

In discussing working capital's many positive effects, it's important to remember this caveat: Because of working capital's interaction with profitability, supply chain initiatives need to be carefully considered in order to achieve the desired outcome. The reason is that supply chain initiatives that reduce working capital also generally influence cost structures. To illustrate, while reducing raw materials inventory by frequent just-in-time deliveries can reduce working capital, the resulting higher transportation costs could lower profitability. On the other hand, certain initiatives that increase profitability could result in an increase in working capital. For example, switching from local suppliers to overseas suppliers can reduce total landed costs. Yet this change could also result in longer lead times that would necessitate holding more safety stocks, negatively affecting working capital. These are the types of trade-off decisions that supply chain managers need to keep in mind when addressing working capital.

EXHIBIT 2

Effects of Working Capital on Liquidity at IBM in 2010

	December 31, 2010		Leverage
	Million $	Days	Cash Flow per Day
Inventories	2,450	17.0	145
Receivables	10,834	40.5	267
Payables	7,804	54.0	145
Working Capital /C2C	5,480	3.5	1,578

Source: IBM Annual Report

Progress to Date on Working Capital Management

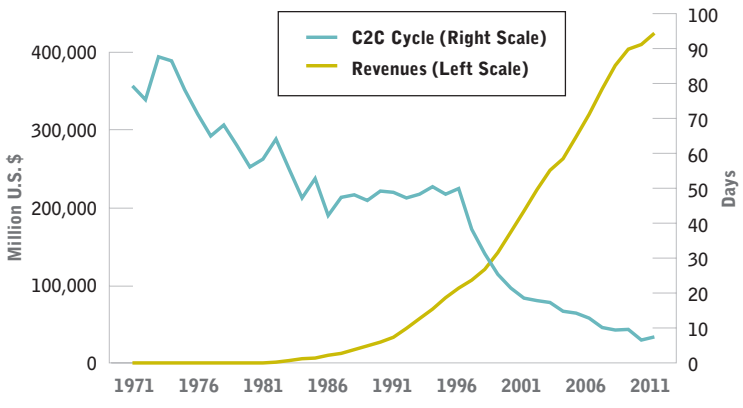
The significant role of working capital in financial performance is the primary reason why C-level executives are so concerned about managing it efficiently. This presents great opportunities for supply chain managers; however, many times those opportunities are left untapped.

Relatively few companies have recorded much success in reducing supply chain working capital. One notable exception is Walmart. The retail giant reduced its C2C cycle time from about 90 days in 1971 to fewer than 10 days in 2011, while growing revenues significantly (see Exhibit 3). Unfortunately, Walmart's impressive and sustainable improvement has been rarely duplicated across entire supply chains. In fact, several studies paint a gloomy picture in this regard. One study conducted by researchers in Europe found no significant and sustainable improvement in the C2C cycle times of the extended supply chains, but rather *displacements* of the C2C cycle times to other supply chain partners.[3] This empirical study shows that neither American nor European companies have been able to continuously reduce their working capital in the past few years. An example of the displacement of the C2C cycle time to other supply chain partners cited in the study can be found in the food supply chain. Specifically, food stores were able to decrease their C2C cycle time from 1.5 days in 1995 to -11.5 days in 2004, while the C2C cycle time of their suppliers (i.e., food and kindred products manufacturers) increased from 51.9 to 53.3 days.[4]

We find these results remarkable, considering that inventory reduction has been the primary focus of the just-in-time programs implemented in so many companies in recent years. The relatively constant days of inventory held that has been reported likely reflects a trade-off between the positive effect of the JIT philosophy and the negative effect of a long global supply chain that necessitates higher inventory levels. Furthermore, several studies show that the majority of companies are struggling in their efforts to continuously lower working capital. For example, one study illustrates that more than half of the largest 1,000 non-financial U.S. companies have failed to reduce their working capital for two consecutive years.[5]

EXHIBIT 3

Walmart's C2C Cycle Times and Revenues from 1971 to 2011



Source: Annual Reports, Walmart, 1971-2011

What's Limiting Success?

Considering the significant leverage of working capital on a company's financial performance, it is disappointing that companies have not been more successful in lowering working capital in a sustainable manner. Our experience points to four major and interrelated reasons for this: shifting management priorities, wrong metrics and incentives, lack of assigned responsibility, and supply chain managers' general lack of financial skills. We discuss each in turn below.

Shifting Management Priorities

Although executives indicate that working capital management is always a top priority, research shows that the attention they pay to it tends to be negatively correlated to the economy. In periods of downturn, working capital management rises to the top of the boardroom agenda. When faced with weak customer demand and tight credit, management immediately looks for the internal levers to unfreeze much-needed cash. When the economy recovers, however, management's focus shifts elsewhere. In a study of the largest 500 global companies covering three economic crises, KPMG found strong evidence that C2C cycle time tends to move inversely with the economic cycle—that is, it improves during downturns and deteriorates in recovery years. [6]

Sustaining working capital management requires management's continuous attention, robust working capital management practices in place, and a cultural discipline that enables organizations to keep working capital levels low. Today, some companies (Apple being a prime example) sit on piles of cash. For these organizations, there is little pressure to unfreeze even more cash

from working capital. However, working capital's impact on financial performance goes far beyond the one-time release of cash, as we discussed earlier. In particular, effective management of working capital is an important driver of the company's profitability. Lower working capital would allow companies to operate at lower profit margins, while earning the same or higher profitability overall. This provides companies with the opportunity to capture market share by either lowering prices or offering higher service levels. Thus, working capital management should always be a core element of doing business rather than an activity pursued only when cash becomes tight.

EXHIBIT 4

Impact of Profits-focused Metrics on Working Capital Practices

Department	Traditional Objectives/Metrics	Desire	Impact on Working Capital
Sales	Maximizing sales	Broad product portfolio and customer specific variants Great service level, products in stock Long payment terms	High levels of finished goods on stock Increased accounts receivable
Manufacturing	Minimizing manufacturing cost	Utilization of manufacturing equipment Huge batches of standardized products	High levels of inventory (finished goods on stock and WIP)
Sourcing	Minimizing purchase prices Reliability of supply	Large order quantities Short payment terms	High levels of raw materials Lower accounts payable

Wrong Metrics and Incentives

Top management is traditionally expected to maximize profits. Accordingly, companies plan and monitor their performance mainly through profit-related metrics such as operating profit or earnings per share. They assign profit-related performance targets to all major departments such as sales, manufacturing, sourcing, and logistics and then link their incentives to these targets. At first glance, this widely accepted approach appears to be a reasonable method of aligning and coordinating decisions made within the organization.

Yet this intense focus on profits has a drawback. Namely, it encourages managers to apply practices that increase profits at the expense of working capital. For example, sales managers are expected to sell as much as possible; hence, they have a tendency to offer customers whatever they want, when they want it. This results in a broad variety of products and numerous customer-specific variants that, in turn, can lead to high levels of finished goods inventory. Further, sales people are more likely to meet their sales target if they can offer the whole product portfolio with no or short lead times while offering customers long payment terms—all of which results in increased inventory and working capital.

Certain profit-related incentives in manufacturing and sourcing also run counter to sound working capital practices. To bring unit costs down, for example, managers often will purchase large quantities and produce in large lot sizes. However, these practices inflate inventory levels and increase working capital. By taking a focus that is solely profit related rather than one that balances profit and cash flow, companies encourage their managers to make decisions that may negatively affect working capital. Exhibit 4 illustrates the impact of profit-focused metrics on working capital practices on three functional areas of the company—sales, manufacturing, and sourcing.

Lack of Assigned Responsibility

According to the commonly accepted definition, working capital is the result of three components and their related business processes: forecast-to-fulfill, order-to-cash, and purchase-to-pay. These processes span the organization, encompassing multiple corporate functions and departments. For this reason, effective working capital management requires both coordinated and

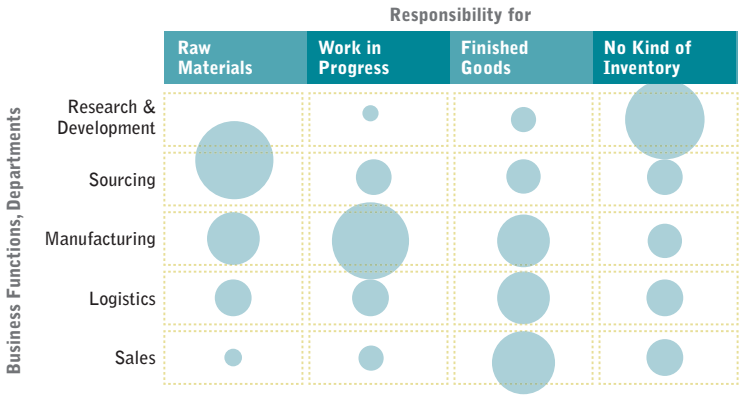
Working capital management becomes one of management's top priorities during periods of financial turmoil, as the corporate goals shift from maximizing profits to securing liquidity.

aligned activities across a company's silos and company-wide assigned responsibilities. Working capital-related metrics and incentives will be of little help if no one—or everyone—is responsible.

In practice, however, clear responsibility for working capital management is the exception rather than the rule. Exhibit 5 illustrates the findings of a German study concerning the responsibilities for inventory, which is used as a proxy for working capital management in this instance.[7] The larger the size of a circle, the more participants in a particular department say that they have responsibility. The results clearly indicate that multiple functions or departments are responsible for different types of inventory, with no responsibilities clearly assigned to a single function.

EXHIBIT 5

A Lack of Assigned Responsibility for Corporate Inventory



Size of circles = number in that department with inventory responsibility.

Supply Chain Managers' Lack of Financial Skills

Working capital is a financial term. However, policies driving working capital are primarily executed by supply chain professionals who have little background in finance and accounting. According to Peter Drucker, if you can't measure it, you can't manage it. And clearly, any measures in place must be understood by the responsible managers. Many financial metrics can be grasped by common sense; unfortunately, working capital and the C2C cycle time are not among them. Although the basic meaning of the metric is simple, the C2C cycle time is notably affected by accounting policies and by business activities that have little to do with working capital management. We provide two examples below to demonstrate how supply chain managers could draw the wrong conclusions.

First, if labor costs increase in the manufacturing department, so do unit costs. Furthermore, costs of sales and inventory also increase, as both are the result of unit costs and the respective quantities. Days inventory held (DIH) as one component of the C2C cycle time should remain fairly stable as both the numerator and denominator increase in the DIH equation (DIH = inventory/cost of sales * 365). However, days payable outstanding decreases for no logical reason. DPO is determined by the division of accounts receivable and cost of sales (DPO = accounts payable/cost of sales * 365). As accounts payables are not affected by the internal cost increase, DPO declines and C2C cycle time becomes longer, suggesting that the company does pay its suppliers sooner and thus locking more cash in working capital.

Second, during the onset of the financial crisis many companies were frustrated by longer C2C cycle times despite their aggressive pursuit of working capital initiatives. In-depth analysis unveiled that the longer C2C cycle time was due to shorter DPO. Note that DPO is calculated based on purchased materials as well as purchased fixed assets. Unfortunately, accounting does not distinguish between these two categories. Thus, the total of purchased materials and fixed assets is used when determining working capital rather than just purchased materials. Because of this, accounts payable and subsequently working capital could be distorted by investment decisions and policies, resulting in misleading DPO and C2C cycle time figures. Thus, even though companies may have saved a lot of cash by not investing in fixed assets (say, a reduction or cancellation of investments in capital equipment), the longer C2C cycle time indicates an increase in working capital.

These two examples underscore that working capital and the C2C cycle time have to be carefully analyzed and interpreted to avoid drawing the wrong conclusions and making poor decisions. The examples also confirm that supply chain managers need basic financial skills in order to make good decisions, attract C-level attention, and avoid being the pawn in the hands of the accountants.

Impact of Supply Chain Initiatives on Working Capital

Let's consider how the three financial components of the C2C cycle time metric—DIH, DSO, and DPO—are affected by supply chain practices.

The link between supply chain practices and days inventory held is very clear, as evidenced by the supply chain glitches we've all seen resulting in higher inventories. Examples include: excessive processing, transportation,

and receiving times; poor management of purchase orders; inefficiency in distribution channels; inaccurate demand forecasts; purchasing from suppliers with long and variable lead times; pursuing policies that result in higher demand variability; excessive safety stock levels; purchasing large quantities of raw materials or component parts to obtain lower unit prices; and more.

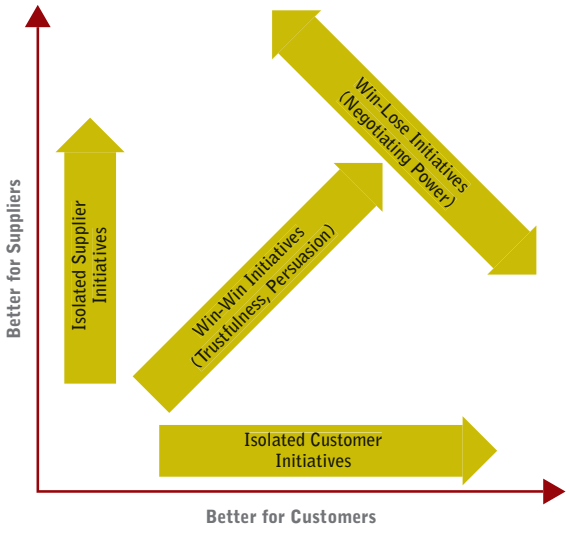
Supply chain practices also affect days sales outstanding—that is, the speed with which customer payment is received. So if the product is not delivered, is delivered in the wrong quantity, or with the wrong specifications, it may eventually be returned in full, thereby affecting the DSO metric. In addition, poor invoicing processes can extend the time period between the sales date and the collection of funds.

Finally, supply chain practices significantly impact days payable outstanding. For instance, purchasing managers can attempt to postpone payment terms to suppliers. Of course, this may not be a viable long-term strategy since suppliers will suffer and this will result in longer days sales outstanding for them. A more reasonable approach may be to postpone payment terms by negotiating an appealing counter-offer such as providing the suppliers better supply chain visibility, higher demand reliability, consistent scheduled deliveries, reasonable delivery time windows, and sharing best practices to improve their supply chain processes.

We classify supply chain initiatives to improve working capital into three categories, as illustrated in Exhibit 6:

EXHIBIT 6

Three Categories of Supply Chain Initiatives



1. Isolated supplier or customer initiatives. These include practices such as postponement/delayed differentiation, JIT, and lean programs resulting in optimized system inventories that can be pursued without influencing the business partners. In such initiatives, the internal ability to optimize is the key to success. These types of initiatives are the most common and have been implemented in many companies. The authors have personally been involved in such initiatives at several Fortune 500 companies.

2. Win-lose initiatives. The success of individual companies in reducing working capital and the relatively unchanged amount of working capital at the aggregate level supports the hypothesis that many companies have shortened their C2C cycle times at the expense of their supply chain partners. Many such companies have reduced their working capital by delaying payments to the suppliers through renegotiated payment terms. Who wins and loses depends on where the negotiating power lies. The *Wall Street Journal* (Oct. 29, 2009) reported that between 2008 and 2009 Amazon had extended its bill payments from 63 days to 72 days. For the quarter reported on, Amazon's sales rose 28 percent, but accounts payable nearly doubled, increasing cash flow by 116 percent to $696 million. While this policy shortened Amazon's C2C cycle time, it certainly increased its suppliers' days sales outstanding by the same amount. Put another way, the extended payment terms did nothing to improve C2C cycle time in the supply chain. Another example of a win-lose initiative can be seen in InBev's takeover of Anheuser-Busch.

Considering the significant leverage of working capital on a company's financial performance, it is disappointing that companies have not been more successful in lowering working capital in a sustainable manner.

InBev implemented a new payment term for their malt suppliers, extending the 30-day payment term to 120 days.

3. *Win/win initiatives.* Cooperation and information sharing among supply chain partners in the order planning process is a common example of a win/win initiative. Persuasiveness and trust are important for the success of these initiatives. They result in sustainable improvements in the supply chain and are advantageous to all the parties in the supply chain. The well-known initiative involving information sharing and cooperative supply chain policies pursued by Walmart and Procter & Gamble is a good example of a win-win initiative. Another example is Mercedes Benz use of its credit ratings to provide suppliers with more favorable credit terms, commonly referred to as "supply chain financing." In working to improve working capital management, supply chain managers need to place the highest emphasis on such win/win initiatives.

Meeting the Challenge

Although working capital management is considered to be a critical activity, it becomes one of management's top priorities during periods of financial turmoil, as the corporate goals shift from maximizing profits to securing liquidity. In fact, the release of liquidity tied up in working capital is critical to mitigating the negative effects of the recent financial and credit crises. As we have discussed in this article, effective supply chain practices can significantly reduce a company's working capital. Yet this can be challenging because supply chain partners tend to compete for capital with one another, particularly during tough economic times.

Supply chain managers need to step up to the challenge and identify and pursue win-win initiatives to lower working capital. Working capital initiatives that benefit only a single company may, in fact, harm overall supply chain performance. Finally, we urge supply chain managers to carefully examine the interactions between profitability and liquidity to achieve the desired outcomes, keeping in mind that initiatives that reduce working capital generally influence cost structures as well.

Working capital management encompasses and seeks to optimize three flows: the flow of materials, the flow of information, and the flow of funds. While supply chain professionals play a key role in coordinating the flow of materials and the flow of information, they are usually not charged with coordinating the flow of funds. Thus, we strongly encourage them to collaborate closely with their financial colleagues, who play the lead role in quantifying the impact of the flow of materials and the flow of information and are charged with controlling the flow of funds. In fact, the best approach to optimizing working capital may be to form effective teams consisting of both supply chain and financial professionals who can work jointly on specific initiatives.

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HOW STEELCASE TOOK CONTROL OF SUPPLY RISK

By Thomas V. Scannell, Sime Curkovic, Robert Lundquist, and Michael Isaac

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Supply risk management has taken on increased strategic importance as global supply and demand markets fluctuate due to political and economic uncertainties, shortened product lifecycles, supplier performance issues, natural disasters, and other factors. In this volatile environment, procurement needs to be established as a risk management discipline that is supported by company structures and processes. This is what Steelcase Inc. accomplished through its Global Procurement Process (GPP)—a comprehensive initiative that links supply risk management to procurement activities in a way that leads to fact-based decision making and superior business performance.

This article describes the Steelcase experience with its GPP. We relate the pain points leading to the creation of the initiative, the key elements incorporated into the GPP, and some results achieved to date. We also discuss implications that the Steelcase experience may have for others pursuing similar supply management initiatives in their own organization.

Steelcase Background

Steelcase Inc. is a global, publicly traded company with fiscal 2012 revenue of approximately $2.75 billion and nearly 10,000 employees worldwide. The company competes in the global office furniture industry with a portfolio of office environment solutions. Steelcase encompasses three core brands: Steelcase, Turnstone, and Coalesse as well as several sub-brands, including Nurture, which is the company's healthcare division. Suppliers provide design, production, and service support for the Steelcase brands and are a key to the company's competitive success.

As Steelcase has grown over the years, many of their suppliers have grown with them, resulting in long-standing relationships with a proven supply base. In this regard, the company had been operating in a relatively low supply risk environment as the strong

Matt Herring

Operating in a dynamic global environment, Steelcase Inc. recognized it needed to get a better handle on supply risk. The solution was an initiative called the Global Procurement Process. This comprehensive approach to risk management is built on two core principles: "begin with the end in mind" and "manage suppliers and risk throughout the lifecycle of the process."

relations with qualified suppliers helped proactively mitigate risks. Despite the relative stability, however, Steelcase recognized that it needed to more effectively manage the many supply risks that all global firms now face. People throughout the organization understood that the supply group managed supplier-related risks such as capacity constraints and quality issues as well as uncontrollable external events like flooding or hurricanes. People outside of the supply group, however, historically had not considered how corporate strategic moves affect supply—and ultimately corporate risks. The following points illustrate the situation:

• Within the last decade, Steelcase entered new markets such as health care and higher education. This drove a surge in R&D and the introduction of new products, requiring new suppliers and new supplier capabilities. The company pushed for shorter-than-typical product development cycle times during this period (including some tough economic times), which resulted in higher supply risks.

• Plant consolidations that were key to the long-term health of Steelcase put stress on the company's suppliers. For example, a local supplier to a Steelcase plant in California might now be required to also serve a plant in Texas. An additional element of risk came not only from the expected logistics challenges, but also from the need to develop new buyer-supplier relationships in light of the service expansion.

• Steelcase in recent years had adopted lean principles and practices that have positively impacted business results. However, this also increased the sensitivity of plants to supply performance and required suppliers to dedicate already constrained resources to integrated lean processes such as JIT deliveries.

The Global Procurement Process

Given these significant and growing challenges, Steelcase recognized that it needed to act to better manage risk. The catalyst for action would be the procurement organization. Procurement at the time was not widely viewed as a risk management discipline at Steelcase—much less an enterprise risk management discipline. But the company's Vice President of Global Operations took a critical step to change this perspective and improve business results by developing a new Global Procurement Process (Exhibit 1).

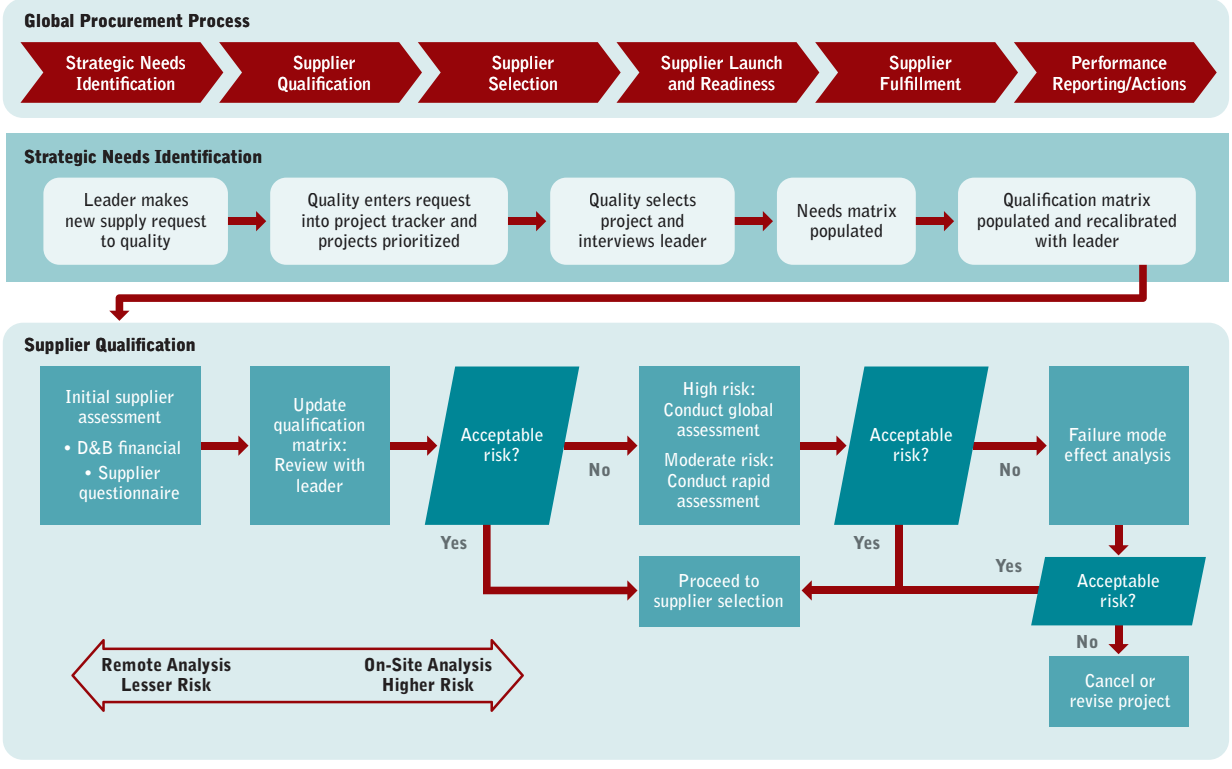
Two underlying principles of the GPP are "begin with the end in mind" and "manage suppliers and risk throughout the lifecycle of the process." The process enables internal customers to make fact-based decisions tied to business needs in an information-rich environment across the lifecycle of the project and relationship. This is in sharp contrast to the traditional approach of simply issuing RFPs and then making decisions based strictly on quotes.

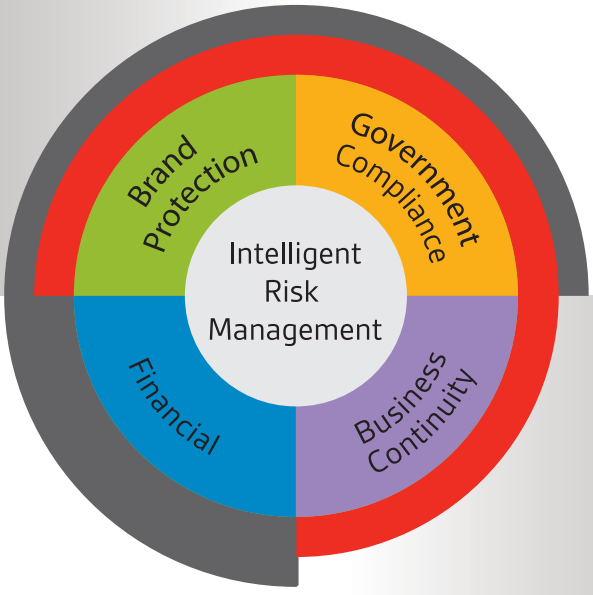
The GPP consists of interdependent and interactive processes that are managed by two groups in the procurement organization. The Supplier Quality Group is primarily responsible for "strategic needs identification" and "supplier qualification," the two processes examined in this article. Supply Chain Leaders (that is, the buyers) are primarily responsible for the other four processes.

Though the Supplier Quality Group and the Supply Chain Leaders support each other throughout the GPP, they have primary responsibility for different processes for a reason. The Supply Chain Leaders are under constant pressure to manage and reduce cost, while ensuring reliable and speedy delivery. Pursuit of such objectives might drive short-term decisions that unintentionally increase

EXHIBIT 1

Steelcase Global Procurement Process (GPP)





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risks. The Supply Chain Leaders, for their part, could not be as effective and efficient if they also had to constantly analyze risks on their own. So it falls to the Supplier Quality Group to analyze the impact of different risk factors on overall corporate and sourcing objectives. The group then provides details to Supply Chain Leaders who then can make informed, risk-adjusted sourcing decisions.

Though the GPP is fundamentally a risk management process, it is presented as a supplier qualification, selection, and management process. The reason: Steelcase did not want stakeholders to feel that they were just going through an engineering risk management exercise. The concept of risk seems to be distant to some people. So without being overly explicit about it, the GPP gets people to buy in to the fact that risk exists, to be sensitive to risk, and to recognize that potential degradation of supplier performance can be predicted to some extent.

Strategic Needs Identification and Supplier Qualification

Considerable forward planning takes place before the Global Procurement Process even begins. On a semi-annual basis, supplier quality and product category leaders interview innovation leaders (for example R&D, marketing, and lead-users) to identify future business and product needs. These needs are communicated to the Supply Chain Leaders for advanced planning. When a new product development project is initiated that has new sourcing needs (such as a part, material, process or supplier), the Supply Chain Leader group contacts supplier quality. The Supplier Quality Group gathers basic information (e.g., who are you, what are you looking for, and what project are you working on) and lists the project in a tracker sheet where projects are prioritized and then selected for action.

Once a new sourcing project is selected, the "strategic needs identification" process begins. The two key tools and outputs of this process are the "Needs Criteria Matrix" and the "Supplier Qualification Matrix". Supplier Quality interviews the Supply Chain Leaders using the Needs Criteria Matrix to identify business needs from the end-user's perspective (see Exhibit 2). The Supply Chain Leaders will also rank the importance of each criterion. Though the interviews last only about a half hour, they are critical because they identify the end-user's business needs that will be used throughout the GPP to guide decisions. The Supply Quality Group also solicits needs information from other key stakeholders such as R&D, category project leaders, materials group leaders, and product development and launch managers.

The Supplier Quality-Supply Chain Leader interviews strike a balance between a too-generic discussion of general needs that fails to capture sufficient detail and a full-scale risk assessment that could become burdensome and time consuming. The interviews are a personal communication and interchange between Supplier Quality and Supply Chain Leaders. The interviews not only help clarify priorities and end-user needs, but also create a higher sense of ownership of project requirements and strengthen the relationship between the two groups, ultimately establishing a higher level of mutual support of objectives throughout the project lifecycle. The Needs Criteria Matrix was designed to ensure that for each purchase decision a broad set of differentially weighted issues are addressed up front—even if at first glance the purchase decision appears relatively risk free. This matrix is reviewed with Supply Chain Leaders throughout the GPP and recalibrated if needed.

The face-to-face interview process that was used to populate the Needs Criteria Matrix creates an opportunity

EXHIBIT 2

Steelcase Needs Criteria Matrix

Date:	
Material Group:	**Process Stakeholders:**
Start Date :	**Target Completion Date:**

- What are you buying?
- Are there engineering, material or test specifications that must be met?
- Describe the process or equipment requirements?
- Do you require the supplier to provide product/material lot traceability, material tracking to manufacturing dates?
- Does the product require any certifications? (e.g., EICC, UL, BIFMA Level, PVC Free)
- Is there an existing supplier? Who is it?
- Have you identified any candidates? Who are they?
- What is the annual spend and material/piece volume?
- Do you have a preference on supplier location?
- Will the product be make-to-order (specials, low quantity) or make-to-stock (e.g., supplier held inventory, high volume/high production runs, large lots with minimal changeovers)?
- Will the supplier manage inventories for us?
- Does it matter what markets the supplier serves? Automotive, furniture, consumer goods, etc.
- Will this product/material have specific lead time requirements?
- What engineering and R&D capabilities does the supplier require (e.g., rapid prototyping, product design, material testing, lifecycle management)?
- Do you require any quality systems, process or environmental certifications?
- Will you require the supplier to provide financial reports (P&L and balance sheets)?

to identify a wide range of issues, some of which may not have been identified if a standardized form had been used in lieu of the interviews. Supplier Quality analyzes and codes the information in the Needs Criteria Matrix and then maps that coded information into a Supplier Qualification Matrix (see Exhibit 3). Not all items on the Supplier Qualification Matrix will be ranked at this point. The individual items on this matrix are grouped into 12 major risk categories plus three special processes (welding, finishing, and adhesives.) Each major category has multiple subcategories, though only the major categories are shown in Exhibit 3. This Qualification Matrix will be used during the supplier qualification process to rate and compare suppliers.

The Supply Chain Leaders are not involved in the initial population of the Qualification Matrix; however, they review the matrix to determine if recalibration is required prior to the supplier qualification step. The Qualification Matrix is the tool that standardizes the information to be used throughout the GPP, but it is not a static document. Project needs will be recalibrated as the process moves forward.

The supplier qualification process is a risk-and-gap analysis that drives the decision to qualify and develop a supplier, or not to do so. The amount of information gathered, the level of detail analyzed, and the allocation of resources for supplier qualification depends on the situation. The first two steps in the supplier qualification process are (1) completion and analysis of a financial report (for example, D&B Supplier Evaluation Risk Rating and Supplier Stability Indicator) and (2) completion of a "Candidate Supplier Questionnaire" that suppliers access and fill out via the Steelcase.com supplier site. A coding key maps measures from the financial report and the supplier questionnaire to the previously initiated Qualification Matrix. Not all items in the Qualification Matrix will necessarily have a score assigned to them already. This may be the case for an item that is a known and relatively low risk commodity that does not require further risk analysis, or for an item that requires a higher level of risk assessment.

At this point Steelcase gets a strong sense of the risk level for potential suppliers as well as the needs that might have to be recalibrated. The initial calibration was driven by a mostly subjective perspective, and took place during the interviews. Scores were then recalibrated after the Needs Criteria Matrix and Qualification Matrix were populated. However, it is not until the tools are actually used with internal customers that the needs analysis becomes more fixed and a detailed perception of risk can be developed. For example, if the Supply Chain Leader is leaning toward a supplier that does not have the highest score or does not perform as well on some of the highest rated need factors, it may be that project needs have changed or some other criteria are now being considered. Either way, by referring to the Needs Criteria Matrix and/or the Qualification Matrix, everybody can be made aware of the potential risk of not selecting the most qualified or aligned supplier. Then, the needs weighting perhaps will be revised because project needs have changed, or the Supply Chain Leader will revisit the supplier selection.

In short, the Supplier Qualification Matrix provides a quantitative and relatively objective way to choose between competing suppliers. The Supply Chain Leader and Supplier Quality groups can compare suppliers by risk category, line-item by line-item, and by total risk.

Levels of Supplier Assessment

Up to this point only remote analysis has taken place—that is, there have been no supplier site visits. In the past, Steelcase may have conducted on-site assessments of all potential suppliers because "that's the way we always do it." However, the company came to realize that for many purchases, particularly lower risk commodity purchases,

EXHIBIT 3

Steelcase Supplier Qualification Matrix

Weight	Item	Target	Score
	1. Company Culture		
	2. Customer Satisfaction		
	3. Environmental and Corporate Social Responsibility		
	4. Facilities Safety and Cleanliness		
	5. Visual Management Deployment		
	6. Research and Development		
	7. Scheduling Systems		
	8. Quality System Deployment		
	9. Supply Chain Integration		
	10. Inventory Management, Product Flow and Use of Space		
	11. People, Teamwork, Skill Level and Motivation		
	12. Equipment and Tooling Condition and Maintenance		
	Special Processes (Welding, Finishing, Adhesives)		
	Total Profiling Score		
	Final Supplier Rating: Criteria Met or Needs Improvement or Needs Significant Improvement or Stop/Override by VP		

Note: Only the major categories are shown; there are many subcategories for each major category.

they may have spent more on the risk assessment process than on the combined cost of purchasing the part and responding to risk situations. For example, the company might purchase 15,000 parts annually at $0.05 per part, resulting in an annual spend of $750. The cost of on-site risk assessment for such an item would easily exceed the annual spend for the item. Steelcase now first determines if remote analysis is sufficient before conducting either a rapid plant assessment or a full-scale global business process assessment. Both types of assessment use the same 12 risk categories and special processes in the Qualification Matrix.

A rapid plant assessment is typically completed in two hours or less by a team of four to five people. Each Steelcase representative has primary responsibility for a few specific risk categories. Prior to the visit, the team studies the supplier's annual reports, analyst reports, prior assessment data, industry characteristics, and project needs. Since Steelcase does not want the supplier to prepare anything in advance, the team does not inform the supplier of the visit date. Nor does it bring a copy of the assessment form or take notes during the visit. Doing such things, Steelcase believes, could impede communication and detract from picking up visual cues. The team meets immediately after the rapid assessment to summarize findings and develop the rating sheet.

In higher risk situations, Steelcase will conduct the more in-depth global assessment. Those items previously ranked as critical needs will be explored in great detail. Steelcase will inform the supplier in advance of the visit, and provide them with initial rankings, comments, concerns, and key areas of assessment. It will also request in advance various supplier documents, policies, and procedures. The supplier will be provided with a checklist of actions to be completed prior to the meeting. Steelcase's objective here is to ensure that the supplier is prepared and has the necessary resources to conduct the in-depth global assessment when it is scheduled.

A key part of the qualification process is linking special technical assessments, which we describe below, to the business process assessments to determine the sustainability of the special technical skills. Highly qualified technical personnel will conduct the special assessment, while Supplier Quality will conduct the global assessment. (Exhibit 4 depicts the process used for linking the assessments.)

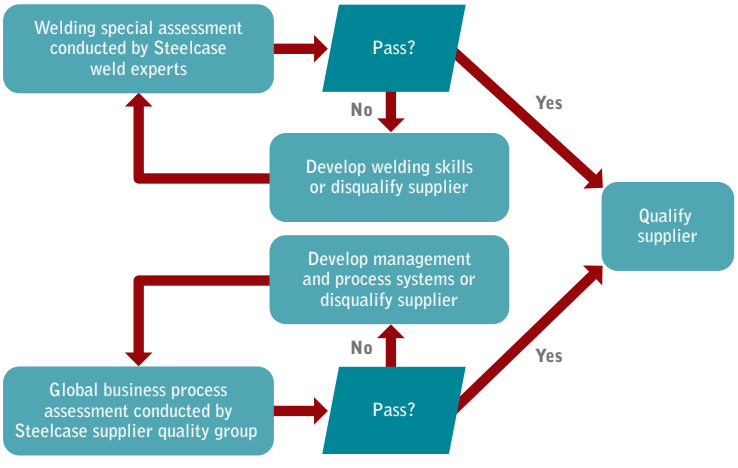
Supplier Quality then integrates the two assessments to determine whether or not the qualities observed at the detailed special technical level are also in place at a higher business process level. For example, a special assessment of a complex weld station process might initially indicate that the supplier is highly qualified to perform that operation. However, nine months later the supplier's weld performance degrades significantly. If the business assessment had indicated that the corporate culture was a problem, or that there was little emphasis on continuous improvement, or that employee retention was a problem, then the degradation in weld performance might have been predicted. Aligning the technical and business process assessments enables Steelcase to determine whether the specific competencies identified are sustainable.

In rare cases of extremely high risk, Steelcase may conduct a full-scale Process Failure Mode Effects Analysis (PFMEA). PFMEA is a structured analytical technique for identifying and evaluating the impact of potential failures on products or processes.

Most PFMEAs are conducted using a highly structured PFMEA form or "template." These templates may be unfamiliar to people outside of an engineering discipline. So rather than gathering information by directly using a PFMEA template, the Supplier Quality Group created an interview guide that puts PFMEA issues into a format and language more familiar to the end-user. This ensures that data will be in terms driven by the buyers—the end-user in this case. The PFMEA requires cross-functional determination of rankings for items such as risk severity, likelihood of occurrence, and likelihood of detection. There will be disagreement regarding final rankings because people from different functions perceive risk differently. Yet while the final ranking is important, the greatest benefit of the process comes

EXHIBIT 4

Global and Special Assessments Alignment



from the team analyzing risks from a variety of perspectives. The process provides each team member with insights into system wide risks.

After all of the necessary assessments are completed, a qualification review form is populated using all available information. Each candidate supplier receives a total score and is ranked. This form enables Steelcase to make fact-based supplier selection decisions. It also makes transparent the level of risk associated with each potential supplier. The Supply Chain Leader group now takes primary responsibility for supplier selection (that is, awarding the business), which is the next step in the Global Procurement Process.

Results and Implications

Steelcase developed the new Global Procurement Process (GPP) to ensure business needs are met by beginning with the end in mind and assessing risks and priorities throughout the process. The GPP was implemented in Steelcase's North American Operations in April 2012. Detailed team training for European teams was just completed in June, and training for Asia-Pacific teams is forthcoming. Ten supplier qualification projects have been completed since GPP roll-out. It is too early to fully quantify the GPP final outcomes, but preliminary outcomes are very positive from our customer groups (Procurement Material Group Leaders and Supply Chain Leaders).

Here's a sample of the benefits realized to date:

- More efficient and effective communications between the Supplier Qualification & Development Team, Procurement Material Group Leaders, and Quality Engineering team members regarding supply risks and procurement processes.
- Company-wide adoption of a framework to implement emerging new supplier requirements as determined by company leadership.
- Increased awareness of all supplier qualification and development projects underway including project objectives and resources.
- No significant customer performance disruptions resulting from new supplier qualification risks.
- Supplier qualification throughput time now more predictable and is being reduced through continuous improvement principles.
- Reduced average time and costs to evaluate and qualify suppliers.
- Fewer detailed (on-site) supplier business process assessments required.

Throughout the development and implementation of the Global Procurement Process, Steelcase experienced a number of valuable "lessons learned"—lessons that may well have relevance for other supply chain professionals pursuing similar initiatives in their own organizations. Here are some that stand out:

1. Companies considering new strategic initiatives—whether it's launching a new market, making an acquisition, redesigning the distribution network, and so forth—need to proactively and comprehensively consider the risk impact on supply processes and partners.

2. Supply management is an enterprise risk management discipline, and needs to be viewed as such. Formal supply structures and processes must enable risk management and raise awareness of supply management's role in this effort.

3. Responsibility for day-to-day purchasing activities and for supply risk management should be separated to support long-term decision-making and optimization of overall supply performance.

4. Because the concept of risk may be distant to some people, risk management should not be presented to the organization as an engineering exercise. Rather, it needs to be framed in the language and business processes familiar to the responsible end party, which in this case are the Supply Chain Leaders.

5. End-user needs and risks need to be clearly specified early in the procurement process. In addition, all subsequent sourcing decisions should be linked to those needs and risks to most effectively mitigate supply risks.

6. Supply risk strategy and supplier selection processes must be flexible to respond to new ideas, project needs, and technologies that may develop. Needs and priorities may be recalibrated as new information is made available and as situations change. However, all subsequent procurement decisions should be tied to the risks and priorities.

7. Given constrained resources in most organizations, companies should apply different levels of risk assessment depending on the perceived level and understanding of risk. (In the case of Steelcase, there are the remote, rapid assessment, global assessment and PFMEA.)

8. A supplier's technical competence in a discipline may not be sustainable if that supplier does not have the culture, leadership, and processes required for continuous improvement. Technical and managerial risk assessments need to be integrated to evaluate the sustainability of supplier capabilities.

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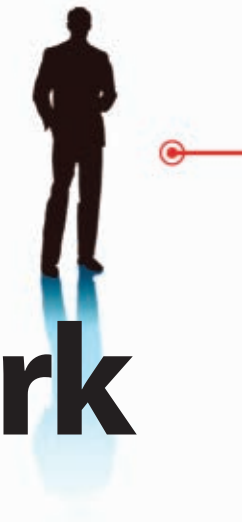
Open Innovation: Putting External Knowledge to Work



By Delphine Manceau, Pierre-François Kaltenbach, Line Bagger-Hansen, Valérie Moatti, and Julie Fabbri

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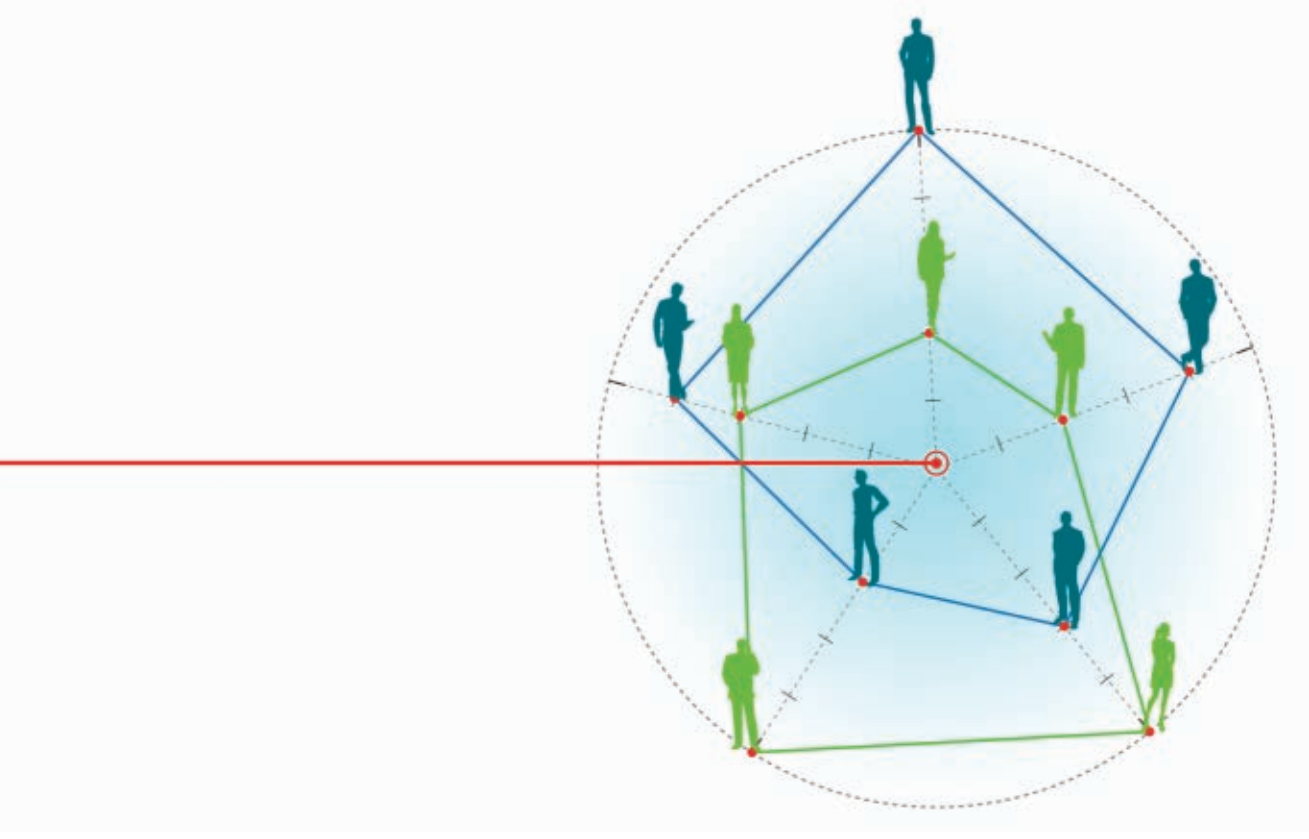
Innovation is no longer the sole preserve of the R&D department. These days, companies draw practical inspiration and profitable ideas from far and wide—from suppliers, academia, competitors, customers, and through crowdsourcing. So who is now responsible for driving so-called "open innovation?" And how can businesses ensure that the necessary relationships are effective? Recent research sheds some light on those questions.

Gone are the days when the research and development department was considered the font of all innovation in the company. These days, businesses draw practical inspiration and profitable ideas from far and wide. More and more, corporate leaders recognize that their organizations can no longer innovate by themselves because competition is more intense and faster-paced and because globalization presents many more innovation opportunities—and threats.

Today, new product ideas can and regularly do come from suppliers. Others may come from relationships between the marketing departments of companies in different industries, or from formal and informal links with academia and independent research centers. And increasingly, companies are turning to Web-based crowdsourcing, reaching out to strangers to propose solutions that their own scientists and engineers may never think of.



But the trend toward so-called "open innovation" raises a host of new questions. Is this practice—sometimes also called collaborative innovation, or shared or distributed innovation—really more effective than centralized R&D activities? If so, how do we know? What kinds of open innovation work best? Assuming that it is beneficial, whose job is it to lead such "outside in" innovation, and how should open innovation activities be organized within the company? How can businesses ensure that the necessary external relationships are effective? And is open innovation necessarily ad hoc, or can it be systemized?

Recent research sheds some light on those questions. Together, i7, the Institute for Innovation and Competitiveness (a European academic think tank created by ESCP Europe Business School) and Accenture's management consulting unit conducted a joint study to analyze innovation practices and processes, supply management, and cross-company collaborations. We explored how open innovation changes the way companies build and handle external partnerships, organize and stimulate innovation internally, and what impact it has on innovation performance.

Specifically, we studied 20 companies that are actively leveraging open innovation to boost their overall innovation performance. (In order to compare across a homogeneous group of companies, we focused on tangible goods industries. Consequently, our sample exclusively covers manufacturing innovation and does not deal with questions related to service innovation.) The sample was selected from among large international companies for whom innovation is a priority and that have been public with their open innovation practices for several years; those practices are mature enough that their impact on the organizations' innovation practice can be assessed.

The results of our research show that open innovation, while not new, is still very much a work in progress. But it is a practice that is here to stay, and as such, is something that supply chain managers everywhere need to understand better—and embrace. In this article, we will look most closely at what it takes to make external relationships work.

The Rise and Recognition of Open Innovation

Today, more than ever, innovation is a top strategic priority. Fully 62 percent of executives questioned in a recent innovation survey say that their business strategy is "largely" or "totally" dependent on innovation.[1] Innovation is a key competitive tool to create attractive new products, to spur demand, to drive products down the cost curve, to woo customers with criteria other than price, and to stimulate the creation of new business models.[2] Confronting globalization and intensified market competition, companies are forced to innovate more and to optimize their innovation processes.

But they can no longer innovate only by themselves; it is now well recognized that they have to rely on large networks of companies and competencies if they are to innovate more productively, more quickly, and at lower cost. There is widespread agreement that open innovation does work. The interviews that we conducted

Bringing external knowledge to the company must not be seen as a substitute for internal practices based on the knowledge held in the company, but rather as a complement to internally developed knowledge.

appear to confirm that open innovation does have positive effects on companies' innovation performance. (See sidebar on the "Benefits of Open Innovation".) The open innovation paradigm pivots on the concept that businesses can use both internal and external ideas and knowledge to be more efficient in creating and capturing value.[3] (Strictly speaking, open innovation is a two-way street; a company may also float its internal ideas outside. For the purposes of this article, though, we are describing the inward flow of ideas. We want to analyze whether open innovation enhances a new culture of innovation within the company.)

Looking at the potential sources for external knowledge and ideas, our research highlights the dramatic increase in the number of external sources that one company can potentially tap into. Consider suppliers—the most frequently cited external source of open innovation, according to our respondents. With the growth of the low-cost-country suppliers, companies are now dealing with a much wider potential supply base. It is the same with universities and scientists. For each of its researchers, Procter & Gamble estimates that there are 200 scientists or engineers elsewhere in the world who are just as good—making up a total of some 1.5 million people whose talents P&G could perhaps use. Such multipliers hint at the complexities of open innovation. For all of the benefits, it also generates huge operational challenges.

Collaborating with external organizations on innovation is not new, however. Jean-Luc Beylat, the director of Alcatel Lucent Bell Labs, speaks for many companies when he says: "Bell Labs have been practicing open innovation forever without knowing it." The term came into currency in a 2003 book by Professor Henry Chesbrough; since then, it has become the primary way in which companies describe how they integrate external competencies and resources in their innovation processes.[4] Indeed, open innovation has become a real buzzword and a large number of reports, papers, press articles, and conferences are organized and published every month on the topic.

Toward a Structured Approach

Open innovation can be relevant for all types of innovation. And it can be practiced successfully with strategic suppliers or casual partners (one-off transactional relationships) thanks to Internet and Web-based collaboration platforms. In the last five years, open innovation has also become something of a rallying point as many companies realized that they needed to structure their innovation approaches in order to be much more efficient and to cope with the economic crisis. As a result, there has been a marked shift from rather random and often experimental approaches to a manageable end-to-end process.

There is not enough space in this article to describe all the dimensions of structured approaches; our commentary will concentrate on best practices in partner management processes. But it is worth noting that the i7/Accenture research explored the importance of the degree of "openness." This ranges from a narrow focus on specific innovation topics, where there is a clear objective when scouting for external partners, to a much broader remit, where deeper relationships with partners may cover a host of innovation themes and where companies welcome any partner (already known or totally

The Benefits of Open Innovation

- Shortens time to market; does so by delegating to partners and ensuring greater access to more internal and external capabilities (contrary to some expectations about cooperation between several and diverse organizations).
- Can help mitigate the risks of in-house innovation—even though it does not appear to cost less.
- Improves intellectual property protection—a paradoxical finding of our research. In a collaborative context, it is mandatory to clarify each partner's IP rights, even though setting up a legal agreement may involve long and complex administrative procedures.
- Helps promote a sustainability agenda. Open innovation can help provide breakthroughs for sustainability projects.
- Enhances the company's innovativeness. The more an organization innovates, whether through open innovation or not, the greater its long-term chances of success.

new) that has any suggestion (whether the ideas are in line with their strategic priorities or not).

In general, the companies that are most experienced with open innovation are those most likely to widen the scope and variety of partners. For instance, General Electric has launched two contests called "Eco Challenge" and "Healthimagination Challenge." These are open to any type of potential partner, including individuals and small enterprises, and are designed to gather all kinds of new ideas for projects.

Our studies also looked at the trade-offs between breadth and depth of relationships with partners. Nearly three-quarters of our respondents say that until now, they have preferred to have more partners. Whatever the level of openness, most companies aim to end up with deep strategic partnerships where the partners not only provide ideas or supply parts, but also make a medium- or long-term commitment to cooperate with the company on one or even several innovation projects. This is true for R&D projects as well as for cooperation with suppliers, which are expected to make a commitment in terms of manufacturing capacity. Of course, it is not easy to build deep relationships with a host of partners.

Excelling at Partner Management

Good partner management is central to the open innovation approach. All of the companies we surveyed have reasonably structured processes for identifying, attracting, and retaining partners. Again, the more experienced a company is with open innovation, the more structured and routinized these processes have become, with the most advanced companies customizing the approach according to the type of partner—supplier, research center, or other. Whatever the specifics of the process, the key is to set up a trustful environment geared to true collaboration and clear benefits for all parties. (See sidebar on "Huggies Diapers: An Innovation Success Story.")

Looking specifically at identification of partners, we found that the search for new partners for specific topics can take two paths.

1. A "partner pull" path means announcing the topics for which the company seeks external options and then collecting suggestions and solutions from any potential partner. Such posts can be made on collaborative platforms, either created or managed by the company (such as Beierdorf's "Pearlfinder") or by external entities (Innocentive [www.innocentive.com] and Innoget [www.innoget.com/] are good examples of open innovation marketplaces).

2. A "partner push" path involves setting up an internal structure in charge of the identification of potential partners all over the world. The structure then gathers information on the partner candidates and contacts them to explore the potential for collaboration. For instance, P&G uses its House of Innovation in Israel to spot lead innovators in many fields.

Of course, the two approaches are not exclusive. General Mills uses its Web platform to identify large companies while using a more proactive process to identify start-ups or small and medium enterprises, a process that is managed by dedicated experts around the world. When seeking universities with which to partner, the food products company uses both processes.

Our study also highlights other interesting practices regarding partner identification and reflecting different maturity levels. For instance, at companies that are beginning their open innovation practices, identification is precisely targeted, usually toward already existing partners. This activity does not require specific tools, but rather the involvement of relevant internal teams. Companies that are further along with their open innovation practices are gradually experimenting with new tools and new partners. For instance, Beiersdorf, the global skin care company, launched Pearlfinder in January 2011 as a trusted network, secured both internally and externally, so that suppliers have a guarantee that their ideas are safe.

Huggies Diapers: An Innovation Success Story

Kimberly Clark, the maker of the Huggies brand of diapers, is an experienced open innovation practitioner. The head of innovation at Kimberly Clark de Mexico S.A.B. de C.V., which produces paper-based consumer products, emphasizes that the company works hard to demonstrate benefits for both parties when it is seeking innovation partners.

For instance, the company worked closely with Velcro on a fastening innovation for Huggies. The new closing system improved the product's performance, making it more competitive. The collaboration between Kimberly Clark and Velcro was deep; both companies dedicated a team to the project for two years. The partnership was secured with a non-disclosure agreement, and both brands were advertised on the final product packaging.

The resulting Huggies product was a commercial success. In addition to benefiting from increased sales, Kimberly Clark de Mexico benefited from know-how and Velcro gained with exposure in a new market application.

Our research shows that open innovation, while not new, is still very much a work in progress. But it is a practice that is here to stay.

We found that the most mature open innovation companies are using several tools and processes to identify partners. Overall, they are signaling their readiness and their ability to be open to any type of new opportunity or new partner. For example, General Mills reacted positively to an idea coming from one of its suppliers to launch a yogurt-style beverage in the U.S. market. Such an idea would never have been listened to a few years ago, yet it turned out to be a great success both for General Mills and for the supplier.

Of course, once identified and selected, partners must be convinced that it is worth their while to engage. Leading open innovation practitioners know how to build, nurture and sustain relationships with people in diverse organizations. Here are some of the levers they use:

- **Promote the company's strengths:** Large companies can mention their size (existing innovation network, large internal talent pool, and so forth), their brands, or their history in order to attract smaller partners. For their part, start-ups can emphasize their expertise and their flexibility.
- **Learn how to collaborate with different partners:** It can be difficult to properly understand and respect partners' practices and constraints. For instance, although P&G was used to a very formalized, hierarchical and process-oriented organization, it had to learn how to work with entrepreneurs. Outside partners must be seen as peers, not just as suppliers.[5]
- **Enhance a win-win scenario:** Partnerships between distinct companies aim to combine and leverage complementary resources and knowledge, as well as (or alternatively) to share the costs and risks of development and investment.[6] To benefit from "a relational advantage,"[7] the companies concerned should avoid opportunism and unnecessary costs in building and managing the partnership. The underlying principle is that the expected outcome for companies is to create higher value together than they could achieve separately.
- **Establish a trustful and open business model partnership:** Trust is fundamental to open innovation—internally as well as externally—even if a partner may later become a competitor. Our observations also highlight the importance of carrying out regular appraisals of innovations developed in partnership.
- **Tell success stories:** It is important to be able to state, at the outset, the potential benefits of working with the company as well as how the potential partner's business will benefit. Previous success stories with other partners can be helpful too. On its corporate site, General Mills highlights examples of how open innovation has driven innovation across the company.[8]

So how formal should open innovation partnerships be? There is no one best answer. Our research showed that some companies have very formal ways of identifying and attracting their partners, while others rely on a more case-specific practice. We observed three approaches:

- **Case-by-case collaborations:** About a quarter of the companies in our sample handle their open innovation activities on a case-to-case basis, either exclusively or alongside their established processes.
- **Semi-standard open innovation processes:** Some companies define a formalized process for the first few steps (mainly the phases of partner identification and selection), but remain very flexible for the next steps of partner collaboration.
- **End-to-end normalized process:** Other companies have formalized processes throughout. For instance, AkzoNobel, Danone Baby Food, Philips, and P&G organize the open innovation process along the four chronological steps: partner identification; selection according to set criteria; attraction and acquisition; and retention.

Organizational Issues of Open Innovation

Third-party research has identified three main challenges to open innovation: motivation; integration; and exploitation.[9] Indeed, there are new questions about whether or not to dedicate people to open innovation and how this should mesh with "traditional innovation" processes; whether to pick a department to be "in charge" or create a new one; and how to devote sufficient energy to change management and to finding the proper IT tools.

During our research phase, we came across three different organizational models:

1. *A centralized dedicated structure*—one department takes care exclusively of open innovation practices.
2. *Some decentralized dedicated staff*—some people are totally dedicated to open innovation practices but are spread out in each division.

3. *No dedicated staff*—everyone is expected to integrate open innovation practices into their projects, as part of their day-to-day activity.

In our sample, the majority of companies have adopted or advocated dedicating staff to promote open innovation (60 percent), while a third consider open innovation to be a corporate culture that should be spread throughout the company. Differences can be explained easily by top management's willingness to allocate resources to open innovation, the maturity stage of open innovation practices, and the company's size and sector. The number of dedicated staff varies from a few people in companies where open innovation approaches are quite recent, to up to 25 experts in mature companies such as P&G.

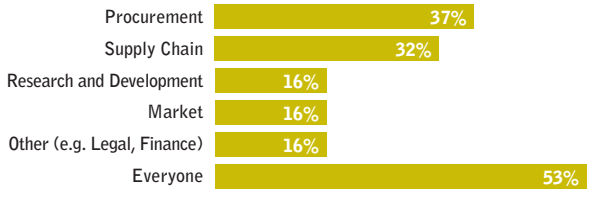
Of course, one of the major advantages of having dedicated staff is that it ensures the availability of necessary resources and budget to run open innovation practices, or at least to anchor open innovation practices in the early phases. Some companies, like General Mills, have champions in each division who promote open innovation practices on a decentralized basis. Others have organizations dedicated to open innovation—an office to handle open innovation practices exclusively. Kraft Foods, for example, uses a hub-and-spoke setup: a focused group of people (the hub) studies expertise on the "how" (how to implement open innovation practices), and in the business units (the spokes), people take advantage of those capabilities.

Based on our observations, at the early start of open innovation, dedicating people seems to be the right approach to secure focused resources, gain management attention, and drive internal adoption. In the medium term, however, open innovation tasks and responsibilities should be infused throughout the company so that it becomes an ongoing way of practicing innovation. It is not simply a question of appointing a "chief open innovation officer." As A. G. Lafley, a former CEO of Procter & Gamble, used to say, "To succeed, companies need to see open innovation not as something special that only special people can do, but as something that can become routine and methodical, taking advantage of the capabilities of every employee."[10]

EXHIBIT 1

Open Innovation: A Cross-Functional Exercise

Departmental Involvement in Open Innovation

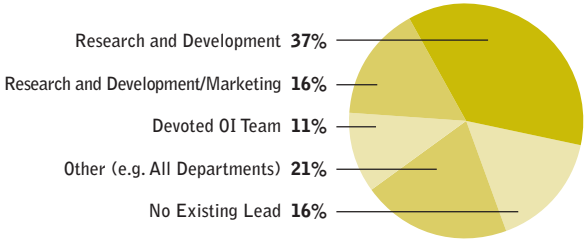


So, which departments are involved in open innovation? In keeping with A.G. Lafley's beliefs, our study has confirmed that open innovation is a cross-functional exercise. Many departments may be involved in the process: procurement and supply chain/logistics, marketing, sales, R&D, legal, finance, and so forth. (See Exhibit 1.) "Sourcing, R&D, and marketing work in a triangle in the management of external innovations," said one of our survey respondents, René-Philippe Tanchou, the chief procurement officer of Danone Waters. Danone has established "triangles" around each external partnership, including people from procurement, R&D and marketing.

However, while it will involve many internal stakeholders, companies usually pick a department to lead the process and cooperate with other departments. In most cases (37 percent of respondents), R&D takes the lead. In many other cases, the lead is shared between R&D and marketing. Procurement also sometimes has the key role, so as to manage innovation partnerships with suppliers. (See Exhibit 2.) The lead department depends on the industry, the cross-departmental power structure in the company, and the business targets.

EXHIBIT 2

Who Takes the Lead with Open Innovation?



Another way to determine who is in charge is to identify which department dedicated open innovation staff report to (if any). In most cases (70 percent), this department is R&D. But other departments are also mentioned: procurement, supply chain (as it is at Unilever), marketing (Danone Baby Food), and dedicated units such as innovation departments (Logoplaste, Philips).

Regardless of which department or combination of departments takes the lead, it is crucial to point out that open innovation calls for a delicate balance between change management and new approaches to innovation. It also necessitates building on the historical strengths of the company regarding innovation. While acknowledging the benefits of drawing on external partners' expertise, it is vital to honor and involve internal R&D and the

company's own in-built creative talents. Indeed, internal innovation leaders are essential if the organization is to have the capability to compare, evaluate, and then integrate others' ideas.

Open Innovation Quest Is Not Over

Our research quickly established that bringing external knowledge to the company must not be seen as a substitute for internal practices based on the knowledge held in the organization, but rather as a complement to internally developed knowledge.[11] It also showed that companies that have a certain maturity with open innovation set themselves up to make open innovation part of their day-to-day business practices.[12] They understand clearly that there is no "free lunch" with open innovation: all of the companies in our study have invested, and continue to invest, in dedicated capabilities—specific organization structures, and specific skills, tools and governance—in order to make open innovation happen.

But our studies also revealed that open innovation brings with it a host of challenges—many of them as yet unanswered. The theft of intellectual property (IP) is seen as a key risk, albeit less than might be imagined because a collaborative context makes it mandatory to clarify each partner's IP rights. A far greater challenge is the need to make and sustain a strong medium-term commitment associated with open innovation approaches, which need major organizational and cultural changes to be effective. Open innovation is not just a method, but a deep change in the way of innovating and building the company's future activities. As such, it requires a major focus from top management over several years.

Open innovation also requires that companies agree to share control over innovation, to share knowledge, to handle cultural differences with external organizations and individuals involved in the innovation process, and to handle remote partnerships and staff. Those factors demand deep-rooted cultural shifts. All of our respondents insisted that this culture conversion was the number one challenge. That explains why all the companies we surveyed are investing in people, processes, and training to embrace the open innovation culture and enhance their capacity for absorbing ideas from outside. Recruiting new profiles, launching dedicated training programs, and including open innovation metrics in personal objectives are some of the most common levers mentioned by our respondents.

That said, open innovation is very hard to measure. Our studies confirm that although there are some interesting discussions about key performance indicators that relate specifically to open innovation and others that gauge open innovation's impact on overall innovation KPIs, there is plenty of room for improvement here.

It is anything but straightforward to shift a company's attitude from resistance to "not invented here" innovations to enthusiasm for those "proudly found elsewhere." But we are convinced that it can happen on a wide scale—and that it already is happening in exemplary ways at organizations as diverse as Procter & Gamble, Akzo, and Danone. The shift won't happen overnight, of course, and it won't happen without significant and sustained efforts by the company's leadership teams. Today is a good day for those efforts to begin.

End notes:

1 See Innovation survey conducted by Accenture: Alon A., Chow D. (2008), "How to get the most from your best ideas," Accenture Outlook.

2 Morand P., Manceau D. (forthcoming), For a new approach of innovation throughout Europe, Institute for Innovation and Competitiveness i7.

3 Chesbrough H. W (2007), "Why companies should have open business models," *MIT Sloan Management Review*, vol.48, n°2, p.22-28.

4 Chesbrough H. (2003), *open innovation: The New Imperative for Creating and Profiting from Technology,* Harvard Business School Press, Boston.

5 Chiaromonte F. (2006), "Open innovation through alliances and partnership: theory and practice," *International Journal of Technology Management*, vol.33, n°2-3, p.111-114.

6 Hennart J.F (1988), "A transaction costs theory of equity joint venture," *Strategic Management Journal*, vol.9, p. 361-374.

7 Dyer J.H., Singh H. (1998), "The relational view: cooperative strategy and sources of interorganizational competitive advantage," *Academy of Management Review*, vol. 23, n°4, p. 660-679.

8 http://www.generalmills.com/Home/Company/Innovation/Our_stories

9 West, J. & Gallagher, S. 2006. Challenges of open innovation: the paradox of firm investment in open-source software. R & D Management, 36(3):319-331.

10 Lafley A.G., Charan R. (2008), *The Game Changer: How you can drive revenues and profit growth with innovation*, Crown Business, New York.

11 Poot T., Faems D., Vanhaverbeke W. (2009), "Toward a dynamic perspective on open innovation: A longitudinal assessment of the adoption of internal and external innovation strategies in the Netherlands," *International Journal of Innovation Management*, vol. 13, n°2 p.177–200.

12 Huizingh E. (2010), "Open innovation: state of the art and future perspectives," *Technovation*, vol. 31, n°1, p.2-9.

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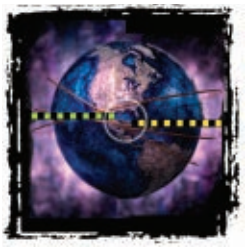
A Product Lifecycle Approach to Sustainability

By Daniel Mahler, Johan Aurik, Emmanuel Hembert, and Kristen Schrieber



Every time we use a product—whether shampoo to wash our hair, detergent to clean our dishes, or soda to quench our thirst—greenhouse gases are generated throughout the value chain. Do consumer products companies consider consumers' emissions due to the product usage when they tally their greenhouse gases? Count their carbon credits? Or calculate their sustainability pledges? Not likely.

An A.T. Kearney assessment of the top consumer goods companies finds that while almost all companies worldwide (96 percent) evaluate ways to reduce their greenhouse gas emissions, only 63 percent work within their entire supply chains to do so. And only 21 percent embark on programs to lower the environmental impact associated with the consumer's use of their products. Rather than evaluating sustainability in terms of the entire product lifecycle, companies generally stay within their traditional approaches, which focus mainly on internal processes such as manufacturing and logistics. Yet, we also found that in some categories less than 5 percent of the total impact of greenhouse gas emissions arises from these internal processes.

A product lifecycle approach to sustainability measures a company's total environmental impact—from raw materials, to production, distribution, consumer use, and disposal of the product by the consumer.

Today, it is becoming clear that companies must go beyond their traditional internal approaches and consider the entire product lifecycle when measuring environmental impact. Future growth will depend on aligning with consumers' priorities. Companies are under pressure to create sustainable products—not only from consumers but also from governments, retailers and suppliers. As natural resources become scarce, companies must consider the long-term sustainability of their business models and broaden their approach to consider their total impact on the environment.

As sustainability becomes a company-wide issue, leading consumer-focused companies are using it as a driver of change—to mobilize all functions around a topic that has the power to transform the business model and be a pillar of future growth.

A New Approach to Sustainability

A traditional approach to sustainability concentrates mainly on manufacturing and logistics—reducing a company's environmental impact by improving production efficiency and optimizing truck loads. The end-to-end approach to sustainability considers a wider range of activities and makes cross-functional cooperation compulsory (see Exhibit 1).

Supply. Within supply, the company examines how inputs are created. Were the agricultural products grown in a sustainable way, using water appropriately, and on land appropriate for the crop? Were chemicals processed in energy-efficient plants? Are materials used for the product environmentally friendly while still fulfilling product specifications?

Retailer distribution. Many companies consider outbound logistics, but there is a next step in the lifecycle to improve upon: distribution and the retailer's impact on the environment in terms of energy and refrigeration.

Consumer use. Depending on the product type, the vast majority of environmental impact is incurred as the consumer uses the product. Food products are chilled and cooked, grooming products use heated water, and cleaning products use machines and hot water. While it may seem out of the company's control, how consumers interact with a product depends largely on product design and marketing.

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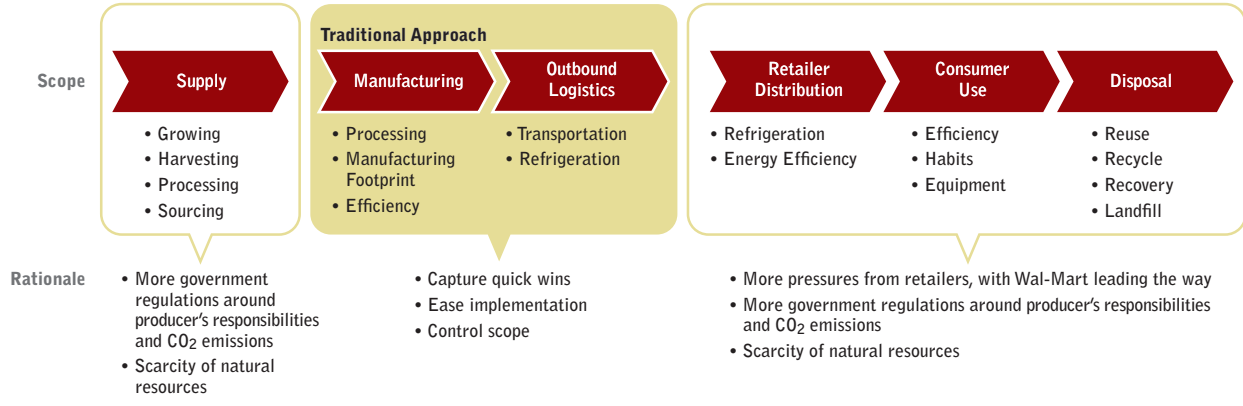
EXHIBIT 1

End-to-End Approach to Sustainability



Source: A.T. Kearney analysis

Disposal. Influencing the consumer toward environmentally sound disposal practices can be done through choices in packaging types, weight, size, labeling and even external initiatives to increase recycling and reuse.

Thinking End-to-End: The Rewards

Considering a wider range of activities requires a larger investment of resources than a traditional approach to sustainability. Although there is more money involved, there are also more rewards. For one thing, the company now has a unique opportunity to examine its global impact across all categories and geographic regions. This can be powerful in standardizing a sustainability approach—not only can targets be set to maximize firm-wide efforts but also functions have to work together to develop mutually beneficial initiatives.

The following offers a brief discussion of the main advantages of the end-to-end product life-cycle approach:

Identify drivers of environmental impact. Establishing a baseline is critical to understanding what drives environmental impact, which will vary by category and geography. For example, products that require electricity will have a larger CO2 footprint when used in coal-heavy China than when used in nuclear-friendly France. It also helps to refine the options the company has in reducing its impact on the environment. It is a good idea to identify drivers that are within or outside of the company's direct control.

Understand environmental interactions. A product lifecycle approach increases awareness of the interactions of different environmental metrics. For example, a change in formulation to reduce the amount of water in a product could increase processing and thus greenhouse gas emissions. Or a formulation change, such as making a quick-rinsing laundry detergent, could reduce both the amount of water needed and the greenhouse gas emissions created by wash cycles. A thorough examination allows a deeper understanding of the full implications of every decision.

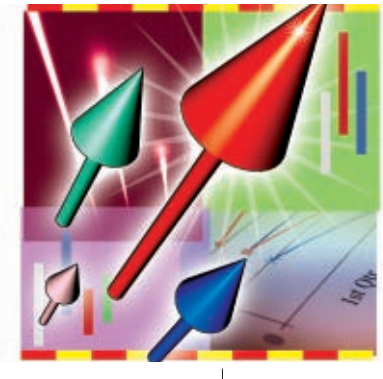
Identify the future impact of consumer behavior. The product lifecycle approach identifies not only today's environmental impact but also the potential future impact, which means decisions can be more far-reaching. As portfolios change over time, both in terms of products and geographies, the major impact areas will shift. For example, as wealth increases in developing countries, more consumers may begin using disposable diapers, with a resulting increase in landfill waste. It is important to forecast where the future impact might be so that plans can be made to preempt the environmental impact.

Forecast external shifts. Companies that anticipate external market shifts will have time to refocus their environmental initiatives. For example, in countries where higher rates of recycling are being driven through legislative changes, fewer company resources will be focused on recycling initiatives. However, other countries with less government intervention will need more private intervention to encourage higher levels of recycling.

By using an end-to-end product life-cycle approach, companies get a clearer understanding of the actual impact they have on the environment. They can turn their sustainability pledges into business targets that can be implemented across the company ensuring that they can identify the drivers of sustainability and prioritize initiatives across the entire value chain all the way down to the consumer's use of the product. This way, internally, sustainability becomes a transformation driver, aligning the organization behind a single highly mobilizing goal. Externally, companies can move beyond the rhetoric to address their total impact on the environment.

Maverick Purchasing Means Slower, Less Reliable Deliveries

Maverick purchasing is not the time saver that some people think it is, according to the latest APQC Benchmarking data.



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

Despite the establishment of a formal procurement process, some organizations have staff members who engage in maverick purchasing—the bypassing of standard procedures to procure items individually. Maverick purchasing often occurs because a staff member views the established procurement process as too complicated or a waste of time. According to APQC's *Open Standards Benchmarking in Procurement*, in bottom-performing organizations maverick purchasing represents 10 percent or more of total annual procurement value (see Exhibit 1). This may not seem like a large amount, but for an organization with $1 billion in annual purchases, 10 percent represents a significant share of purchase value.

To determine how maverick purchasing can affect an organization's procurement function, APQC looked at its Open Standards Benchmarking data from two groups: those with 1 percent or less of their annual purchase value obtained via maverick purchasing and those with 16 percent or more of their annual purchase value procured via maverick purchasing. The results of the analysis indicate that order placement time, order processing time, and quality of deliveries all improve with less maverick spending. The only metric running counter to this pattern is overall procurement costs; specifically, less maverick purchasing is associated with higher procurement costs.

Effects on Order and Delivery

APQC's data reveals that, despite the common belief that maverick buying enables employees to obtain materials faster, this purchasing method may result in slower order processing and delivery of purchased items. At the median, organizations with higher levels of maverick purchasing need more than three business days to issue a purchase order to a vendor; those companies with less maverick purchasing, on the other hand, need only five hours to issue a purchase order

EXHIBIT 1

Total Annual Procurement Value Purchased via Maverick Spending

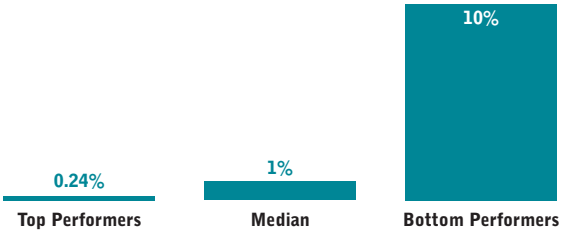


EXHIBIT 2

Cycle Time in Hours to Place a Purchase Order

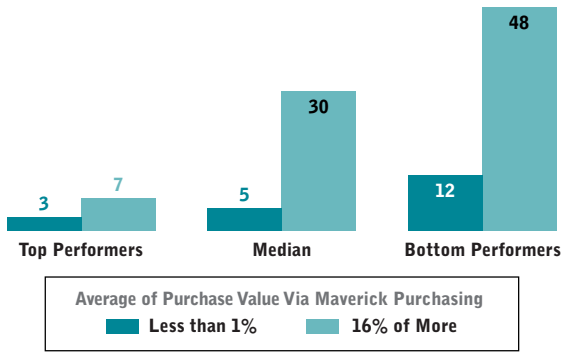
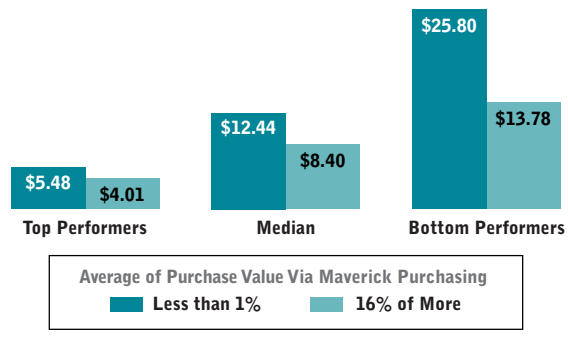


EXHIBIT 3

Total Cost of Procurement Purchases

Per $1,000 in Purchases



(see Exhibit 2).

Organizations with more maverick buying also have longer supplier lead times on purchased materials and services. At the median, they have lead times of 12 days, whereas organizations with less maverick purchasing have supplier lead times of only 6 days. The more time that is needed to receive items from vendors and to place purchase orders indicates that deviating from set procurement processes does not result in faster delivery of items.

In addition to the amount of time needed to purchase and receive goods, maverick buying can affect the quality of deliveries. APQC's data indicates that maverick purchasing is associated with fewer orders received complete. At the median, organizations with less than 1 percent of their annual procurement value purchased via maverick buying have 94 percent of their purchase orders complete. In contrast, those companies with 16 percent or more maverick purchases receive only 90 percent of their purchase orders complete.

The shorter times dedicated to ordering and receiving goods and the larger amount of purchase orders received complete achieved by organizations conducting less maverick purchasing could be the result of those organizations having more streamlined and regulated purchasing processes. In particular, they often have stricter procurement processes and systems that ensure adherence to processes and reduce the opportunity for maverick buying. Standardized and enforced processes can result in a purchase order being issued to a vendor more quickly.

Organizations with less maverick purchasing are also more likely to use vendors that have been vetted. This typically means that procurement staff has a relationship with the vendor and may have established processes to quickly issue purchase orders to that vendor. The use of approved vendors also means that organizations have already determined the reliability of those vendors, which can lead to faster and more complete deliveries.

Effects on Procurement Cost

It is important to note that less maverick purchasing does not lead to benefits across the board. In particular, APQC's data indicates that organizations with less maverick purchasing actually spend more on the procurement process overall (see Exhibit 3). At the median, there is a $4.04 difference in the cost of procurement per $1,000 in purchases between organizations with less than 1 percent of their annual purchase value made via maverick buying and organizations with 16 percent or more. For an organization with $1 billion in purchases annually, this represents a difference of over $4 million dollars in procurement spending.

Despite the common belief that maverick buying enables employees to obtain materials faster, this purchasing method may result in slower order processing and delivery of purchased items.

The higher procurement costs incurred by organizations with less maverick buying are likely related to the fact that these companies have higher procurement systems costs and more full-time equivalent employees (FTEs). At the

median, organizations conducting less maverick purchasing spend $76.72 per $100,000 in purchases for systems related to ordering materials and services, whereas organizations conducting more maverick purchasing spend only $16.67 per $100,000 in comparable purchases. Organizations with less maverick purchasing most likely put expensive procurement systems in place as a way of ensuring that staff members adhere to procurement processes. These systems can include electronic purchase order approval or special purchasing avenues for low-dollar items. Regardless of the types of systems in place, more complex technologies can be contributing to higher procurement costs.

In addition to the amount of time needed to purchase and receive goods, maverick buying can affect the quality of deliveries.

The need for more procurement personnel could be another contributor to higher procurement costs. The median number of procurement FTEs for organizations conducting less maverick purchasing is 117 per $1 billion in purchases. Organizations conducting more maverick purchasing have 78 FTEs per $1 billion in purchases at the median. Companies with more formalized procurement processes may need additional procurement personnel to support these processes. The additional personnel may also include staff needed to develop and maintain close relationships with strategic suppliers.

Take a Comprehensive Approach

APQC's research shows that, contrary to what some employees may believe, maverick purchasing does not necessarily result in faster deliveries of orders. To reduce the occurrence of maverick purchasing, organizations should invest in additional procurement staff and more sophisticated purchasing systems. Although these investments may result in higher overall procurement costs, they will streamline procurement processes and ensure that goods are ordered from vendors already vetted and approved. This, in turn, will result in purchases that provide the best value to the organization—regardless of price.

Organizations should take a comprehensive approach to formalizing procurement processes and reducing maverick buying. They should adopt and customize procurement systems so that it is impossible for staff to order products without following established channels. Electronic purchase order approval can be built into systems to ensure that appropriate vendors are used and that purchases are obtained at a reasonable price. Employee training and better communication within the organization regarding the importance of adhering to procurement processes can also reduce the incidence of maverick purchasing.

At the same time, organizations must consider whether their procurement processes are too complex. They must also evaluate whether or not employees have received adequate training on procurement procedures. If adequate training has not been provided, or if the processes are not user-friendly, employees will bypass formal procedures to get what they need. Organizations must consider all factors that can lead to increased maverick purchasing. They need to take steps to address these factors, while keeping in mind the potential for additional costs, so that procurement can provide value to the enterprise beyond the bottom line.

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STATEMENT OF OWNERSHIP, MANAGEMENT AND CIRCULATION

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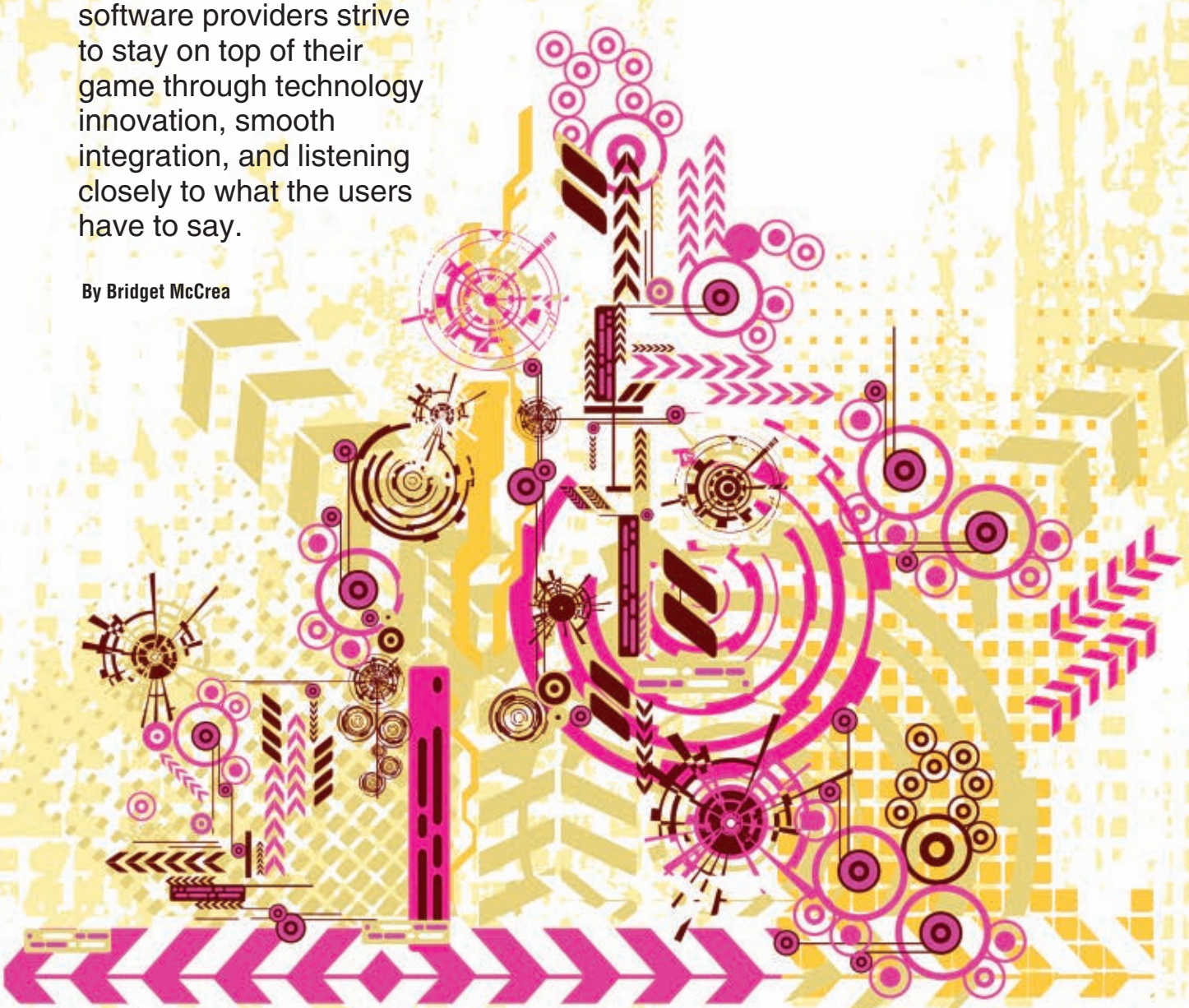
A SPECIAL SUPPLEMENT TO:
SUPPLY CHAIN MANAGEMENT REVIEW

Spotlight on the Software Leaders

Leading supply chain software providers strive to stay on top of their game through technology innovation, smooth integration, and listening closely to what the users have to say.

By Bridget McCrea



Everyone knows that getting to the top and then staying there is no easy task. And while this year's list of the top 20 supply chain software suppliers has some longstanding familiar names, the rest of the list typically fluctuates from year to year (see accompanying sidebar). This just goes to show how quickly the supply chain software vendor cards can reshuffle during a 12-month period.

Even as companies move up and down, or off and onto, the list of top 20 supply chain vendors, there are some clear distinctions between these firms and the rest of the suppliers in the space. Belinda Griffin-Cryan, global supply chain executive program manager at Capgemini Consulting, identifies the three key factors differentiating the leaders from the rest of the pack as: mobile solutions, supply chain analytics, and ease of integration.

"Mobility is hot right now. Everyone wants to be able to use smartphones, iPads, and other mobile devices with their business and supply chain applications," says Griffin-Cryan. "It's pretty clear that the companies that can mobilize their applications are emerging as the winners right now."

Simon Ellis, practice director at IDC Manufacturing Insights, says companies like SAP, Oracle, and JDA stand out with their "platform" approaches to software development and delivery. Each offers a wide range of capabilities that—when tied together—create a comprehensive supply chain software suite. "That's certainly appealing to a lot of manufacturers," says Ellis, "for whom easier integration may be more important than squeezing out that last drop of solution functionality."

When assessing the status of Top 20 best-of-breed companies like RedPrairie and Manhattan, Ellis says both have managed to propel themselves to the top by leveraging laser focus in the supply chain execution space. "By focusing very specifically on one or two functions, these vendors offer up some of the best alternatives in the marketplace," the analyst says, "and are attractive to companies that, for example, might prioritize functionality over ease of integration."

Accent on Analytics and Service

Supply chain analytics are in high demand as companies try to figure out the best way to distill large quantities of data down to useable, actionable information. This trend isn't limited to the supply chain, of course, but it certainly does apply in a world where multiple business functions (manufacturing, warehousing, transportation, labor, etc.) spew out reams of data daily.

"Shippers realize that the data is very valuable if they can find ways to use it and make sense of it," explains Griffin-Cryan, who points out that historically, much of that collected data went to waste as companies tried to figure out how to analyze it and use it. That's where the top supply chain vendors and their solutions' analytic capabilities come into focus. "The solution that offers good front-end analytics is valuable," says Griffin-Cryan, "because it helps shippers evaluate all of that data in a quick, clean, and meaningful manner."

When assessing the supply chain solutions that are currently on the market, Griffin-Cryan says users also look for ease of integration. "We're seeing companies steering clear of having numerous, custom-built, point-to-point connections between different solutions across their supply chains," says Griffin-Cryan. "It's clear that the leaders are the large players that offer full suites of options with integration built into them. Users just pick the modules, most of which are designed to easily integrate with one another, instead of trying to create cumbersome linkages and connections."

The top supply chain vendors also differentiate themselves by providing top-notch support and service both during and after the sale—two factors that can quickly make or break a successful software implementation. "It's not just about which vendor has the best solution," says Griffin-Cryan. "The implementation, installation, and ongoing maintenance also have to be as painless as possible for the buyer."

Ignore this requirement and word of a failed implementation, or one that didn't meet the shipper's expectations, could spread like wildfire through the close-knit supply chain ecosystem. "The horror stories float around the community and all vendors have some skeletons in their closets," says Griffin-Cryan. "Where the top providers stand out is in the ability to say: 'we acknowledge the problem and here's how we're going to address it and remediate it.'"

Leaders Continuously Invest

In terms of technological advancements, Bob Ferrari, managing director at The Ferrari Consulting Research Group in Boston, says the Top 20 stand out on their ability to innovate, adapt, and flex to meet customer needs. Most run complex R&D departments that work closely with sales representatives to determine customer pain points and figure out how to alleviate them. "The leaders are continually investing in their technology, releasing new versions of their products, and providing thought leadership to customers," says Ferrari. "That's what sets them apart."

Leading vendors now also offer a

Supply Chain Software's Top 20

The supply chain software market grew significantly in 2011 and is on track to post even more growth by the end of 2012. Leading the charge in the sector is a stable of vendors that brought in anywhere from $34.6 million to over $1 billion in revenues last year, according to research firm Gartner. The list below gives the Top 20 software suppliers by revenue and shows availability of their offerings in four categories: SCP, WMS, MES/MRP, and TMS.

Top 20* supply chain management software suppliers

No.	Supplier	2011 Revenue	URL	SCP	WMS	MES/MRP	TMS
1	SAP	$1.018 billion	www.sap.com	x	x	x	x
2	Oracle	$935.6 million	www.oracle.com	x	x	x	x
3	JDA Software	$368.5 million	www.jda.com	x			x
4	Manhattan Associates	$141.5 million	www.manh.com	x	x		x
5	RedPrairie	$99.7 million	www.redprairie.com		x	x	x
6	Epicor	$92.9 million	www.epicor.com	x	x		x
7	Descartes Systems Group	$87.7 million	www.descartes.com				x
8	Servigistics	$64 million	www.servigistics.com	x	x		x
9	Kewill Systems	$63.7 million	www.kewill.com				x
10	IBS	$58 million	www.ibsus.com	x	x	x	x
11	Totvs	$57.8 million	www.totvs.com	x	x		x
12	Logility	$52.3 million	www.logility.com	x	x		x
13	Lawson Software	$51 million	www.lawson.com	x	x	x	x
14	Retalix	$50.9 million	www.retalix.com	x	x		x
15	IBM	$50.8 million	www.ibm.com	x			
16	Infor	$50.5 million	www.infor.com	x	x	x	x
17	GTNexus	$46.2 million	www.gtnexus.com	x			x
18	HighJump Software	$45.8 million	www.highjumpsoftware.com		x		x
19	Quintiq	$39.5 million	www.quintiq.com	x		x	x
20	Accellos	$35 million	www.accellos.com		x		x
21	Kinaxis	$34.6 million	www.kinaxis.com	x		x	

* Source: Revenue estimates provided by Gartner (www.gartner.com) with the exception of Retalix, which was provided by the company.

range of deployment options, Ferrari observes. With the days when companies invested only in classic, behind-the-firewall, licensed software quickly waning, he says leading-edge developers are coming up with cloud-based, hosted, on-demand, SaaS and other flexible delivery models. "The bottom line is that for the supply chain vendor to remain relevant in the market right now," says Ferrari, "it needs to continue to provide customers with a broader set of deployment options."

Ultimately, Ellis says the supply chain vendors that have climbed to the top and managed to stay there are the ones who understand the marketplace, solicit continuous input from users, and truly understand how to identify and solve business problems. "The technology has to be effective and efficient, and it must address those pain points," says Ellis, "all while driving value for the customer."

What Do Users Want?

Figuring out exactly what customers want is critical for the software leaders—and all others who aspire to this category. At Oracle, for example, senior director of logistics product strategy, Jennifer Sherman, regularly gets in front of customers to find out what they want, what they need, and what value they expect to garner from their supply chain solutions. Right now, she says better visibility over supply chain costs is a

major goal for most of them.

"They want more visibility into the cost and impacts of the decisions that they're making," says Sherman. "Many are making decisions based on an old paradigm: if an order is made, I have to expedite it. But the cost of that expediting isn't always factored into the equation. Better visibility over order margins, as an example, can help companies mitigate that during the order negotiation process and tell them upfront if they're going to make money on the deal."

And while most of today's modern software systems can calculate and deliver supply chain cost data, it's not always available to the decision maker who needs it. Oracle is soothing that pain point with its Fusion Global Ordering solution and its Distributor Order Orchestration product. The former factors in profitable metrics and makes them available to the decision makers who need them, while the latter is an order fulfillment solution that works in tandem with multiple logistics and execution systems.

"We came to the conclusion that the data needs to be more granular, comprehensive in nature, and embedded into the user interface," Sherman explains. "Finally, it needs to be integrated into the company's planning, CRM, and fulfillment and logistics tools, to be most useful and effective."

Cost containment and management are other major issues for today's users, says Daniel Vertachnik, executive vice president and CCO at TMS provider MercuryGate. They want to know how to cut costs and stay competitive in the marketplace, and see their transportation operations as a prime starting point in that quest. "A lot of companies are focused on reducing transportation costs and ensuring that product gets where it's going on time," says Vertachnik.

Malysa O'Connor, director of the logistics practice group at Kronos is also seeing customers trying to squeeze more of out of their existing resources and work smarter, better, and faster. As a developer of Labor Management Systems (LMSs), Kronos works often with companies that are struggling under the pressure of higher expectations from their own customers, margin erosion, and the high cost of human resources.

"Since labor is often 50 percent of a company's operating costs, human resources is a key area that firms are looking to address," says O'Connor. "They look to LMSs to help them control unnecessary overtime, minimize costly under- and over-staffing, and reduce the number of non-productive hours."

Doing More With Less

Improving efficiencies and figuring out how to do more with less are also top of mind for shippers right now. Those that rely on technology to run their transportation components with fewer employees, for example, can effectively deploy those resources to customer service, sales, and other front-end positions. The same mentality can be applied on the road, where arrangements like multi-stop loads and multi-leg loads allow shippers to consolidate shipments and save money.

Improving efficiencies and figuring out how to do more with less are also top of mind for shippers right now.

Dashboards or "control towers" are also in high demand as shippers strive to gain better visibility over their end-to-end supply chains, says Vertachnik. They want to be able to pull up information in a dashboard format quickly on their laptops, tablets, or mobile phones, review the data, and then make good decisions based on that information. MercuryGate's Control Tower Visibility offering captures data operationally from various parties and centralizes management capability while continuously monitoring the status of all the events.

"Much like an airport control tower does, we give users the ability to manage all data across the supply chain, collaborate with partners," says Vertachnik, "and make real-time, live operational decisions."

Answering the Value Equation

As business has become more global in nature the need for robust Global Trade Management (GTM) solutions has increased exponentially. Amber Road executive Ty Bordner says customers are looking for technology platforms that can not only handle global trading logistics, but also the export and import compliance regulations associated with that global trade.

"Traditionally those two components were separated into two different systems, but that's not what the market really wants," says Bordner, who adds that the GTM provider has been able to successfully bring the two components together, under one umbrella. "For most shippers it makes sense for the logistics and compliance to be processed through one system."

Like most supply chain software vendors, Amber Road is also getting requests for more supply chain visibility—from the time the PO is created until the order is delivered, and everything in between. In addition to improved visibility, Bordner says the users are looking for supply chain solutions that are agile enough to accommodate future growth and still deliver reduced costs, better mousetraps, and less risk from a compliance standpoint. "Those are the value equations that everyone is looking for right now," Bordner adds.

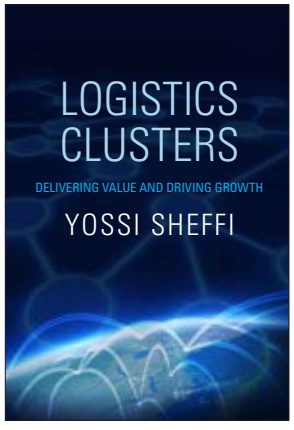
Bridget McCrea is a freelance writer specializing in supply chain. She can be reached at bridgetmc@earthlink.net.

Logistics Clusters

New book tells how an emerging concept called logistics clusters can become one of the most powerful drivers of growth and added value in today's global economy.

Economic clustering is not a new phenomenon. In the time of the Renaissance, Florence was a magnet for the famous artists of that era—but not just the artists. Everyone needed to support the creation of their masterpieces—from workshop apprentices to the laborers who transported bronze, granite, oils, and other raw materials needed—were drawn to that cluster.

Five hundred or so years later a similar cluster emerged in what become known as Silicon Valley. In this instance, the output of innovators was not works of art in the strict sense, but rather computer technology. And as with Florence, as the technology progressed, a comprehensive infrastructure built-up around the technology innovators, propelling Silicon Valley into a powerful driver of the U.S. economy.



So while the concept of economic clusters is not new, writes Yossi Sheffi in his new book, the emergence of logistics clusters *is* new, or at least comparatively so. Sheffi is the well-known director of MIT's Center for Transportation & Logistics and author of *The Resilient Enterprise*. His latest book, *Logistics Clusters: Delivering Value and Driving Growth* (MIT Press, 2012) chronicles the evolution of logistics clusters and, most importantly, explains the significant implications of this development for the global supply chain community.

Logistics clusters are broadly defined as geographically concentrated sets of logistics- related business activities—the warehouses, carriers, terminals, 3PLs, forwarders, brokers, and so on needed to get goods to market.

The author's thesis (indeed the book's subtitle) is that logistics clusters can drive tremendous value and growth. Big logistics clusters like Rotterdam, Singapore, Memphis, and Panama bring huge direct and indirect benefits to their region, Sheffi points out. Operations at the Port of Rotterdam, for instance, directly employ 55,000 people with another 45,000 working in various support capacities.

The number of jobs generated by logistics clusters is just one part of the equation. Another important part is the type of jobs. The author notes that in addition to the traditional blue collar (warehouse, transportation, dock workers) and white collar (managers, procurement specialists, IT experts) jobs, clusters provide "value-adding" job opportunities for repair technicians, product postponement specialists, light manufacturing workers, and more.

Importantly, Sheffi notes, most of these jobs are not "offshorable" because of the inherently localized nature of the work or services provided.

Logistics clusters, too, offer distinct operational advantages in terms of scale and scope because of the breadth and depth of the supporting infrastructure. The equipment, people, infrastructure, technology, knowledge base, transportation, and warehousing services are all right there. But beyond the core logistics service, Sheffi notes, logistics clusters offer two powerful business advantages: the ability to postpone product differentiation closer to actual sale of the product and the availability of cost-effective services beyond logistics.

The ability of logistics clusters to add value later in the supply chain is manifested in such operations as final product delivery, retail-ready preparation, and country configuration of products for labeling or regulatory requirements—all activities made easier by specialists who are resident in the clusters. Plus, the clusters typically offer expanded options for repair and maintenance as well as the opportunity to share assets with other companies in the cluster.

Logistics Clusters is a valuable resource for supply chain professionals because it not only describes a trend that affects global trade, but also explains how readers can take advantage of this development. Sheffi's first-hand experience with companies and institutions around the world add color and context to the story. Whether it's the rapid emergence of a logistics cluster in the unlikely location of Zaragoza, Spain, or the build-up of the massive industrial and service complex around Rotterdam, the reader gets a sense of being at the heart of the action. In short, *Logistics Clusters* is a practical and highly accessible addition to any practitioner's library. (For more information visit, Logisticsclusters.mit.edu).

—Francis J. Quinn, Editorial Director

A SPECIAL SUPPLEMENT TO:

SUPPLY CHAIN MANAGEMENT REVIEW

Special Report

Creating competitive advantage

We examine how warehouse and distribution center design and operations have evolved to play a critical role in meeting overall business objectives in today's multi-channel world.

By Bob Trebilcock, Editor at Large

For years, warehousing, distribution and manufacturing were largely invisible to the corporate enterprise. Of course senior-level executives knew they had plants, warehouses, and distribution centers, but they didn't necessarily know what purpose they served. How else do we explain the trend toward outsourcing manufacturing to contract manufacturers and distribution to third-party logistics (3PL) providers? The attitude was: Let them own all those assets and figure out how to make a profit.

Today, supply chain processes have come out of the business shadows. Increasingly, the C-suite recognizes the contribution that warehousing and distribution makes to the bottom line. More importantly, there is the recognition that, when done right, warehousing, distribution, and manufacturing can create a competitive advantage.

As a result, logistics and supply chain professionals are more connected to the business than ever before and are now playing a critical role in furthering business objectives. What then are the biggest business issues affecting the design of materials handling systems as well as the warehouse and distribution best practices that run today's game-changing operations? We put that question to seven system integrators and consultants to find out what is top of mind with their customers and potential customers.

Optimizing in a multi-channel world

Multi-channel selling is transforming the retail industry. The challenges are big enough for retailers that once sold through stores and now are selling online. It's more pronounced for those companies that once sold wholesale and now have their own stores, their own e-commerce shopping carts, or both.

The hurdles range from adapting facilities that were designed to handle cases and pallets to piece picking to grappling with SKU proliferation. "We do a lot of retrofit projects for retailers," says Jeff Ross, vice president of consulting for Forte. "We see semi-automated or automated solutions that worked great when direct-to-consumer was 5 percent of the business, but now it's 30 percent of the volume. We have also seen direct-to-consumer retailers that have opened their own brick-and-mortar stores. Either way, we have to think differently for the client."

How does that translate to the shop floor? In many cases, it means applying familiar technologies and equipment in different ways to create to new processes. "For one retailer, we waited until the packing station to differentiate between e-commerce and retail orders," says Ross. "We pick in batch regardless of the type of order, but once items hit the sorter, single line orders are sent to one section of the building for packing while multi-line orders are sent to another area for packing."

In another application, multi-line orders use a sort-to-light, or put-to-light, process that features a light-enabled cubby wall with spots for a group of totes for outbound orders. Items are picked to a tote that is transported into the put wall area.

There, an associate scans the license plate bar code label on the tote to launch the sort-to-light process. As the associate removes and scans pieces

Automated materials handling technology and new processes are enabling multi-channel retail distribution from one facility.

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"Our retail customers are asking how can they invest the right level of capital to maximize throughput during average days and still meet peak demand."

—Mike Dunn, Fortna

in the picking tote, the lights identify the outbound tote that has been designated for that order. Once all the items for an order have been put to the tote, it's transported to a packing station.

"The technology is not new," says Ross, "but we're applying it to a new process."

From multi-channel to omni-channel

When the Internet burst onto the scene a decade ago, many retailers segmented their customers by sales channels. They had brick-and-mortar customers and they had online customers. They also had two channels of distribution, one for retail store replenishment and another for online order fulfillment, which was often managed by a 3PL.

That thinking is changing, says Mike Dunn, group vice president for Fortna. "Retailers with some degree of sophistication understand that all these channels play together to create a single face to the customer," says Dunn. "As retailers and e-tailers put together their plans and trajectories, they expect to gain new customers and grow their businesses, but they don't know which channel that growth will come from."

Bringing those channels together is affecting the design of distribution centers in several ways, says Dunn. One is in systems that can handle the pallets and cartons that historically went to retail stores along with individual item picking associated with direct-to-consumer order fulfillment. The second is in the ability to scale. "Our retail customers are asking how can they invest the right level of capital to maximize throughput during average days and still meet peak demand," says Dunn.

On the one hand, that is leading to technological solutions, like putting in a dual-speed sortation system. "The majority of the year, we run the sorter at a slow speed and get a high utilization of the chutes," says Dunn. "At peak periods, we run the sorter at a higher speed with lower utilization of the chutes, but the ability to handle the throughput."

On the other hand, retailers are also recognizing that in an omni-channel world, the experience should be the same regardless of how a customer engages with a retailer.

"Retailers that are running their retail and e-commerce channels through the same distribution center are trying to drive consistency in how a product is packaged," Dunn says. "We're designing packaging processes that ensure that the presentation to the e-commerce customer and the wholesaler are consistent."

Information is the coin of the realm

Businesses thrive on information. Marketing and sales organizations are

Network optimization—deciding where to locate facilities and how they operate—is driving many of today's distribution projects.

striving to learn as much about their customers' habits, likes, and dislikes as they can so they can turn that information into sales. That is the promise of social media sites like Facebook and the genius of iTunes and Amazon.

Information has been the coin of the realm in the supply chain as long as there have been supply chains. But, just as sales organizations are turning to the information collected by social media sites, cookies, and other Web-based systems to learn more about their customers, operations managers are trying to get more information out of their systems, says Ken Fry, business segment manager for Rockwell Automation.

"The large customers and machine builders we work with want to know what information can they pull off of a sorter to get more out of the system, or how they can use a conveyor that may not have been part of the original design of the system," says Fry. "That information has always been out there. But it has not always been easy to get."

Certainly it wasn't easy to distribute once you got past the maintenance technician who understood the system. "Today, with the proliferation of control systems and Ethernet as a standard, all of the different information networks within a system are converging," Fry says. "The plant scheduler now has equal access to that information, and we can filter that information so you get what you need in order to make decisions."

Similarly, the rate of product change today is staggering. Flat screen televisions are getting bigger than ever while other products, like iPods and cell phones, are getting smaller than ever.

"You need flexibility because the products change so often," Fry says. "That is calling for control systems that are easy to install and can change from one type of product to the next."

The importance of cycle time

For years, distributors have focused on productivity and accuracy in order fulfillment processes. The goal was to reduce the cost per case of filling an order. Typically, that was the result of doing more work with less labor. No one is saying that controlling costs is no longer important, but as the need for order fulfillment speed heats up, there is increased focus on cycle time, says Bryan Jensen, senior principal at St. Onge.

"More and more, the focus is shifting from accuracy and productivity to cycle time diminution," Jensen says. "Clients want to know what it will cost to take an order by 5 p.m. or later and still get

it out in time for overnight delivery."

While the need for speed has mostly been a direct-to-consumer phenomenon, thanks in part to Amazon, the question is now being asked by businesses selling to other businesses. "Whether they are pursuing these strategies for a competitive advantage or because that's what they have to do to compete, there is a belief that faster is always seen as more valuable by the consumer," Jensen adds.

The attention to cycle time is impacting DC design in several ways. For one, some sellers are developing systems that help them recognize just what level of speed a consumer really wants and is willing to pay for. Some customers may be more than happy to wait a week for an order. Some truly want the product next day.

"We're developing systems to batch orders in waves by order priority for those customers who will pay for speed," Jensen says. "We might also put more money into high-speed sortation systems or goods-to-person picking solutions to cover peak periods than in the past."

More importantly, companies are looking beyond the cost of labor. "Leading retailers and e-tailers are no longer just looking at how many people they can remove from the process to justify a system," Jensen says. "Instead, they're putting more value on the ability to respond to peak demand in a very short window of time."

Automated material handling systems are increasingly becoming the answer to a chronic labor shortage in warehouses and DCs.

Optimizing the network

Mergers, acquisitions, and consolidation are facts of life for any company intent on growing market share. But, what happens the morning after the acquisition is complete? Then, it's a little like getting married: After the honeymoon, you have to figure out what to do with two sets of everything. In the supply chain, you have to figure out what to do with two manufacturing and distribution networks that often serve the same geographies.

"Network optimization is a factor we're seeing across all industries," says Kelly Reed, a partner with Tompkins International. "Companies are asking us how they can make their network most efficient from a transportation cost and a labor cost."

In some instances, Reed adds, a company may just have two DCs that it wants to combine into one. For larger organizations, however, the questions are more strategic and complex. "In some instances, we have companies focused on the cost of operating a facility or the cost of labor in a location," Reed says. "In other areas, the network strategy is driven by customer service requirements." Tompkins recently worked with a client that located a new facility in Fresno so that it could serve both Los Angeles and San Francisco with next-day ground deliveries.

Those types of distribution strategies are also resulting in networks with facilities designed for a specific purpose. Tompkins, for instance, has worked with companies to consolidate all of their slow-moving items into one central facility with regional DCs for faster-moving products. Another strategy is to create one or two large centralized DCs with smaller "forward-located" DCs that can turn around orders very quickly for Internet fulfillment, flash sales, or store replenishment of fast-moving items.

"I read recently that Macy's is using their store rooms as Internet fulfillment centers and picking from store inventory," Reed says. "As the way we engage with customers changes, many companies are making up the rules as they go along. We're all learning what works and what doesn't. It's going to have implications for distribution networks and how orders are filled."

Managing SKU proliferation

Like mergers and acquisitions and the growth of multi-channel retailing, SKU proliferation is another fact of business life for retailers and wholesale distributors. "Everyone is trying to find the magic bullet to increase sales," says Norm Saenz, senior vice president for the supply chain group at TranSystems. "The perception is that more product offerings, more styles, and more colors give a competitive advantage."

In the distribution center, that translates as too little storage space and too few pick

positions to get the product out the door. "We had one client that was storing 8,000 SKUs in 500 pallet positions," says Saenz. "They were reduced to putting as many as 20 different SKUs in one pallet position in their picking area. Instead of picking just from the lower levels, they were picking from all of the levels in the storage area."

The solution was not complicated. Pallet rack was converted to static wide span shelving with three openings instead of one 6-foot pallet opening. In addition, the storage area was converted from 10-foot aisles to 4-foot wide narrow aisles. "We went from a conventional lift truck to a worker-assist vehicle that will work in a 3-foot aisle," Saenz says.

"They have 8,000 pick locations today," Saenz says. "They are much more efficient and there are far fewer errors."

Designing the workforce of the future

Despite the recession, labor availability remains one of the most persistent issues confronting warehouse and distribution center managers. Training and retaining experienced personnel is almost impossible when many facilities experience a 50 percent turnover in the workforce every year.

"We began hearing about this five or six years ago from Canadian clients as warehouse workers moved out west to work in the oil fields," says Chris DeLisle, a senior engineer with Witron. "Today, it's a universal issue, across all industries and regions, especially as the economy begins to improve."

It's not just the availability of labor. As the workforce ages, distribution centers are being forced to rethink labor intensive processes, such as manual palletizing or case picking.

As a result, DeLisle says, clients with sufficient scale and volume are taking a harder look at automation. "First and foremost, automation can reduce the number of people required to operate a facility," DeLisle says. "But we also have an opportunity to make the manual processes as ergonomic as possible."

The result, he adds, is that the employee retention rate in automated sites is generally higher than in conventional facilities. "One of the challenges to our industry is how do we enrich the job so that the associate isn't bored after 10 minutes," DeLisle says. "That's why I think that automation is more attractive to younger kids. If we can offer them a solution that exposes them to technology and provides a path to grow in their careers, that is attractive to them."

—Bob Trebilcock is Editor at Large for the Supply Chain Group

A SPECIAL SUPPLEMENT TO
SUPPLY CHAIN MANAGEMENT REVIEW

Special Report

2012 Warehouse/DC Operations Survey: Mixed signals

A record response reveals that supply chain professionals are divided in terms of investment: one side remains cautious, while the other is on the verge of making significant changes to their warehouse/DC operations. How have your operations emerged from the Great Recession?

BY **MAIDA NAPOLITANO**, CONTRIBUTING EDITOR

After years of slow economic progress, the results of sister magazine *Logistics Management*'s (*LM*) 2012 Warehouse and Distribution Center (DC) Operations Survey show that there appears to be two schools of thought emerging from the ashes: There are those companies that remain cautious, staying conventional with minimal plans for expansion; and there are those on the verge of making significant investments and changes to their distribution operations.

Designed to gauge activities and trends in warehousing and DCs, our annual survey offers a first-hand look into the state of today's DC and warehouse operations. In September, a survey questionnaire was sent via email invitation to *LM* readers. The survey gleaned 805 qualified responses (a new record for this survey) from upper-level managers to CEOs—all personally involved in decisions regarding their company's warehouse and DC operations.

Most participating companies came from manufacturing (44 percent), followed by distributors (28 percent), third party providers (9 percent) and retailers (8 percent). An assortment of products handled in the DC was once again well-represented with food and grocery leading the pack at 11 percent, followed by industrial/chemical at 10 percent, and electronics and building materials, tied for third, at 8 percent each.

This year's findings revealed mixed signals coming from opposite ends of the spectrum. About 52 percent of respondents are adopting a more cautious approach, spending less than $250,000 for warehousing equipment and technology in 2012.

"That's a predominant statistic," says Norm Saenz, senior vice president and principal of TranSystems, a supply chain consulting firm and our partner for this survey. "It supports how tough economic times have controlled spending to less than $250,000 for a majority of respondents. That's only good for minor improvements to operations, such as racking or the purchase of a lift truck, versus opening a new facil-

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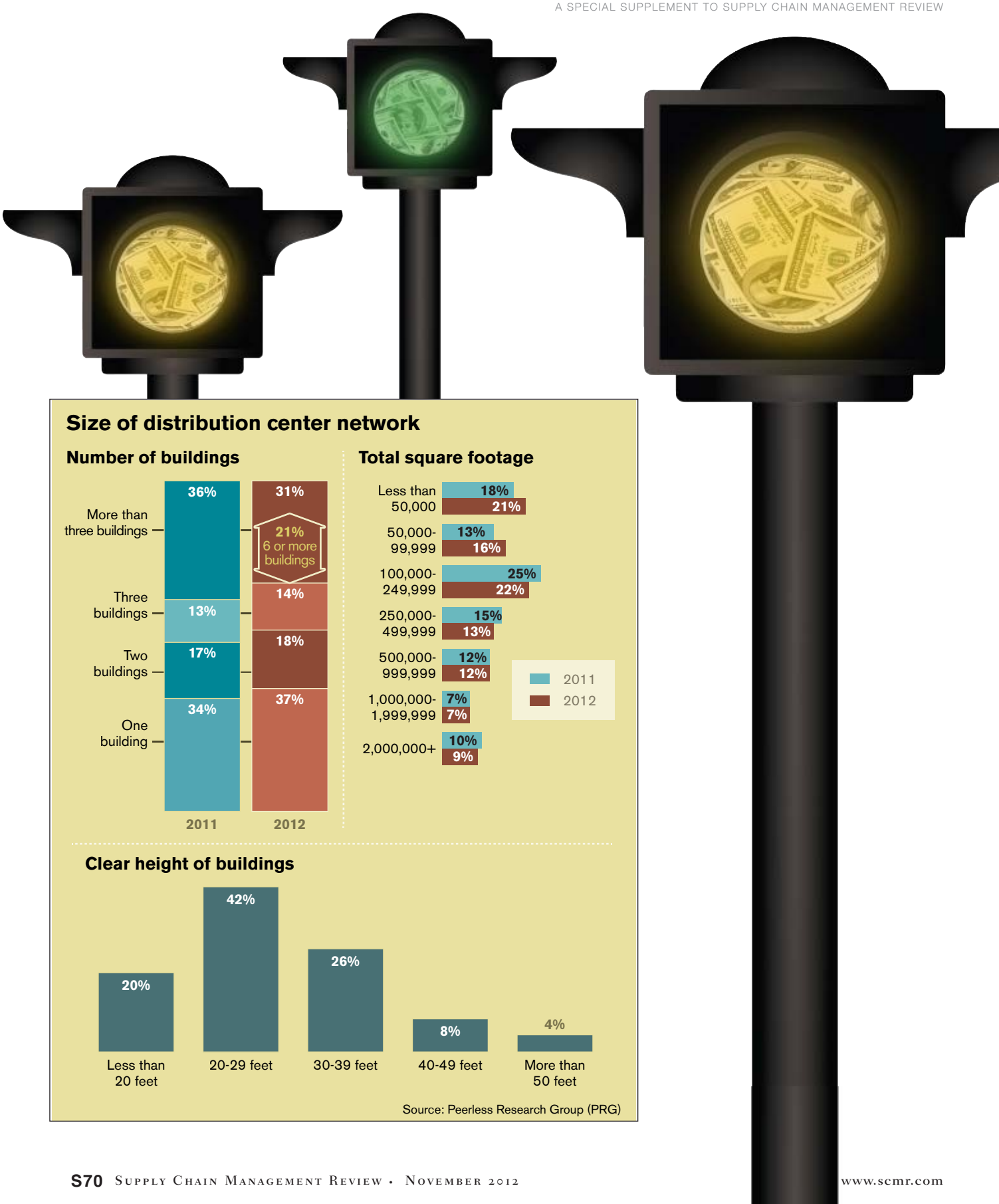

Size of distribution center network

Number of buildings

Total square footage

Clear height of buildings

Source: Peerless Research Group (PRG)

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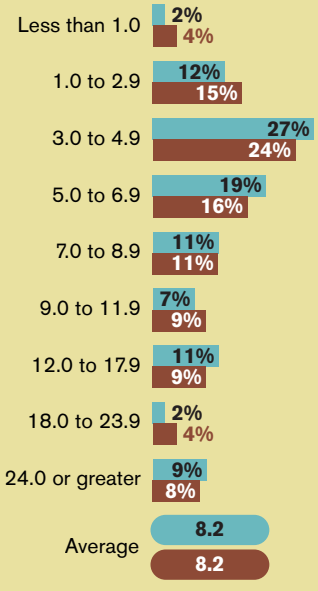
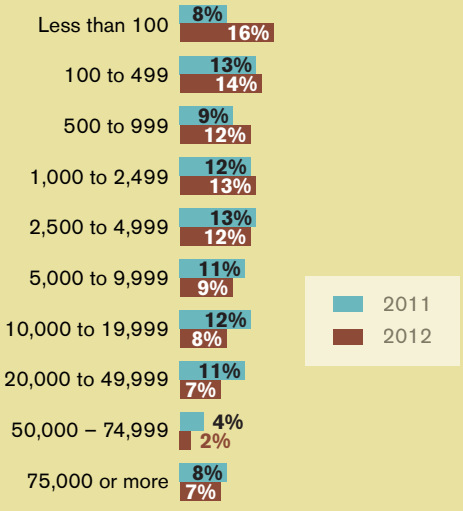
Scope of distribution center operations

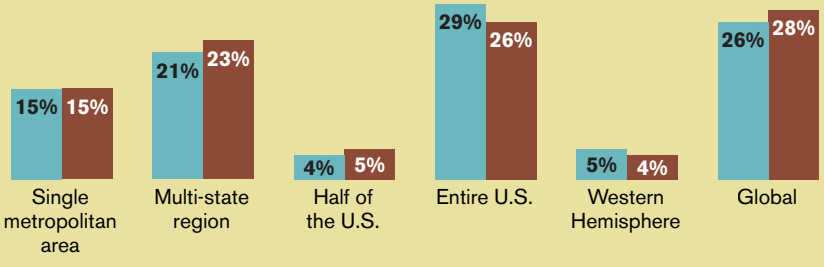
Annual inventory turns



Number of SKUs



Areas of service



Source: Peerless Research Group (PRG)

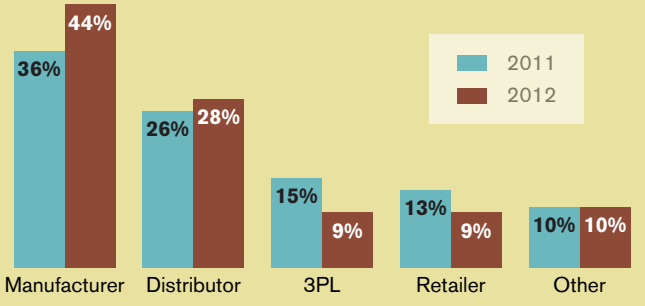
ity or implementing new technologies."

However, Don Derewecki, senior management consultant also from TranSystems, prefers to focus on the other end of the spectrum: those 17 percent of respondents who are spending $1 million or more this year, and another 16 percent planning to spend that same amount next year.

"That's for significant projects—an indicator that companies are doing more than just replacing worn out equipment," says Derewecki. "These stronger companies have diligent managers who have probably been continuously shaving points off their operating costs over the past few years. By now all the low hanging fruit is gone, so they're starting to get more aggressive and finally looking to squeeze the trigger on investments in mechanization and automation."

Over the next few pages, we'll dig into the high-level findings of the 2012 Warehouse and Distribution Center (DC) Operations Survey to share more detail on how the warehousing and distribution landscape has changed over the past year. This year we've updated portions of the survey to capture emerging trends while continuing to track the critical measures of warehousing activities we've charted over the past six years. Let's see how your operations compare to what your peers are doing inside the four walls.

Type of business



Source: Peerless Research Group (PRG)

What's trending?

Despite the mixed signals, there's one clear conclusion that both Derewecki and Saenz derived from this year's survey: Corporate is making its presence felt inside the warehouse and DC.

"There's an increasing recognition of the importance of the supply chain and how much money is being spent on it," says Derewecki. "Corporate managers have become increasingly focused on the details that make the difference, even at the DC level."

According to Saenz, this fact is never more evident than in the number of respondents who say they're using their enterprise resource planning (ERP) system's warehouse management system (WMS) functionally in the DC (27%)—twice the number of respondents using best-of-breed WMS (13 percent). "Corporate does not want to play around with expensive WMS packages," speculates

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Saenz. "They made a commitment to use an ERP system, so they want to use everything these systems can offer—even though it may not be the best thing for the warehouse."

Derewecki agrees, adding that the WMS being offered today by the big ERP players "isn't as bad for the warehouse as it used to be." He says that 10 years ago some of his clients were forced to use ERP at the DC level because corporate wanted everyone to integrate with the company's ERP system. "All of the functionalities that managers used to have with their standalone WMS just weren't there," says Derewecki. "In some cases, they had to switch back to more manual operations." But these days, he adds, developers have significantly improved the functionality of ERP's WMS packages.

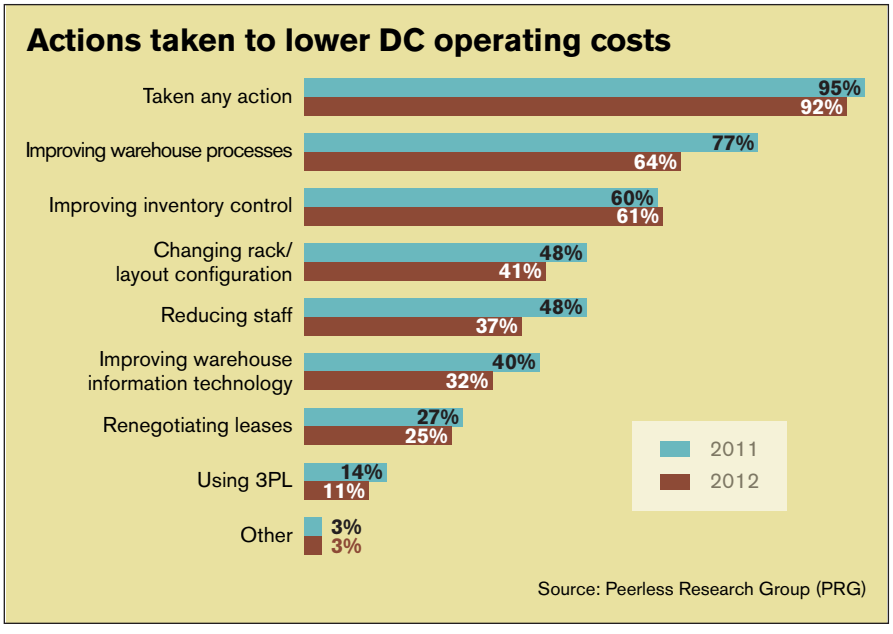
"As more companies run their businesses with an ERP system, it's easier and less costly to simply use that ERP's WMS," adds Saenz. "I think this is a trend that's going to continue."

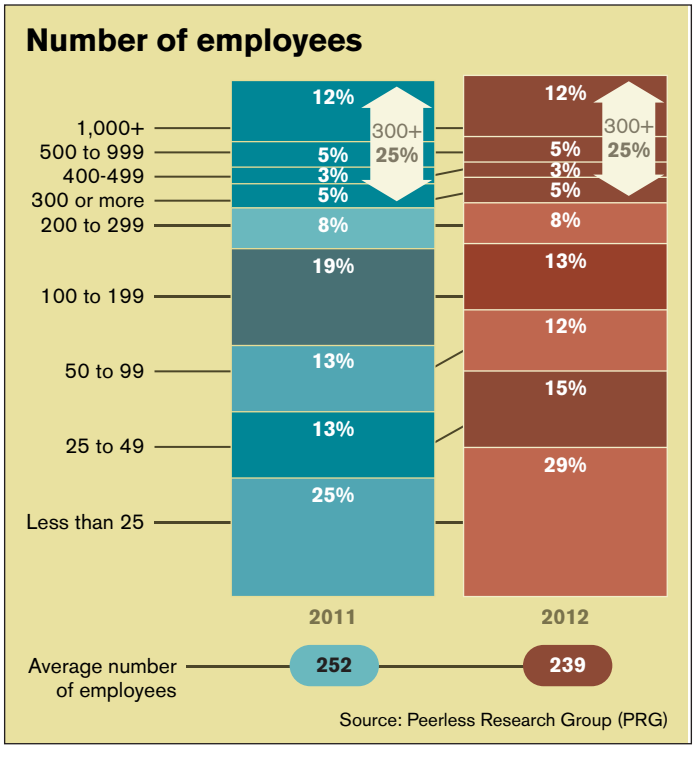
There's also a trend towards a more consolidated network. Since 2010, the percentage of respondents with three or fewer buildings has been steadily increasing, while the percentage with four or more buildings has been steadily decreasing. Saenz believes that it's all part of a continuing push by companies to do more with less.

"However, with fewer facilities, you may achieve savings in operating costs, but you may be potentially increasing your freight," Saenz cautions. "This is not a particularly good move with today's inflating gasoline prices."

Even more mixed signals surface from this year's findings. While some networks may be contracting to fewer facilities, about 60 percent of respondents are planning to do some sort of expansion this year. Twenty-six percent are increasing their number of SKUs, and 25 percent are increasing the number of employees.

Despite these plans for expansion, average inventory turns have not improved and remain steady at 8.2. Derewecki offers a possible explanation: "At many companies, in spite of the emphasis on inventory control and the improvement in information systems tools, the proliferation of SKUs has prevented the overall turn ratios from improving."





The multi-channel effect

For the first time, we decided to track how companies use market channels—or how they make product available to their customers.

Most of the respondents (84 percent) report servicing more than one channel: 67 percent report shipping to wholesalers; 57 percent to retailers; and 29 percent are e-commerce based, shipping products directly to customers.

"I would be most interested in tracking e-commerce penetration over the coming years," says

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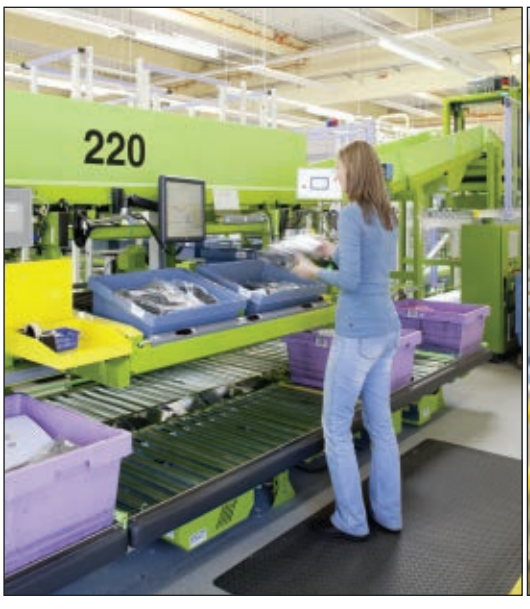

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Derewecki. "It seems that despite what industry our clients are in, if they are not using the Internet now, they have a plan to get into it." He notes that more consumers are now using brick-and-mortar stores merely as "showrooms" to see a particular model, confirm its looks and functions, but then head back home to compare costs among web retailers before ordering that model online.

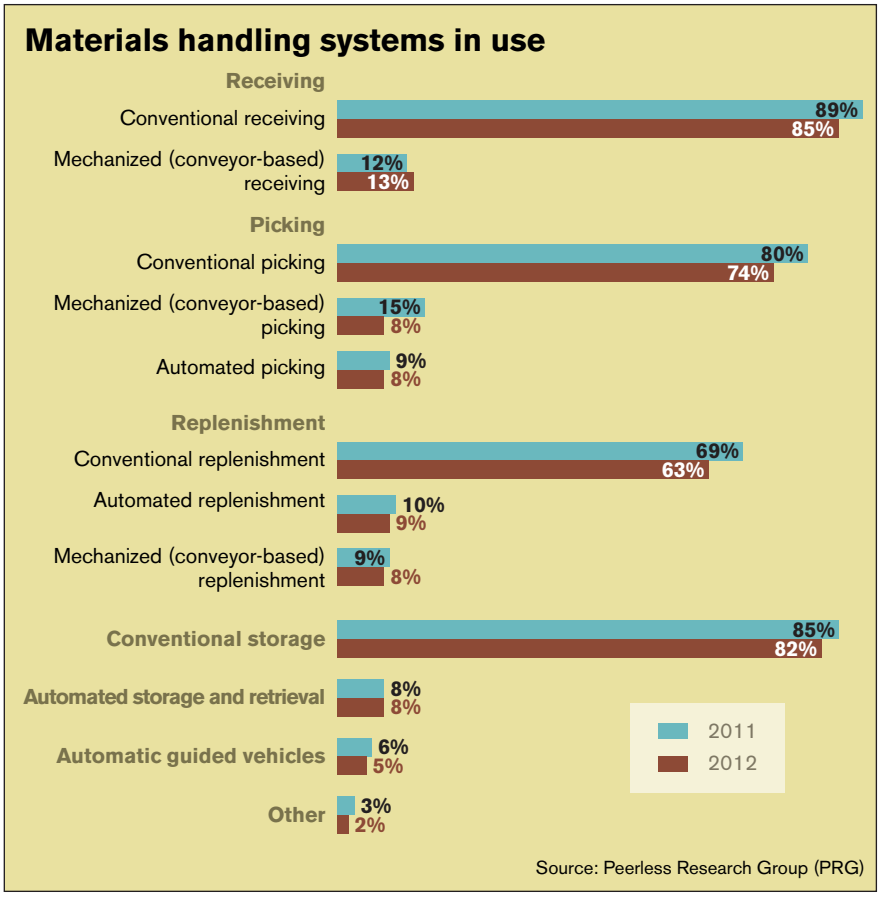
How are multi-channel respondents fulfilling their orders? Forty percent are filling their orders themselves from one main DC, designating separate areas for retail or e-commerce or scheduling specific pick waves for certain channels. "Almost 25 percent of respondents have already decided to put it in a separate DC," notes Saenz. "It would be interesting to see how these results change as each channel grows. I predict more separate DCs and the use of more third-party logistics providers."

2012 DC network profile

The profile of this year's distribution network remains mostly the same as the past few years.

Sixty percent of respondents operate less than 250,000 square feet of space in their distribution network, with most common clear heights of 20 to 29 feet. Derewecki predicts that, over time, the mix is going to shift towards taller, higher buildings. "Lift truck technology is making higher buildings very practical," he says. "Newer, double-deep reach trucks, for example, can lift to a height of over 36 feet."

Seventy percent of respondents report undertaking some kind of distribution network optimization and location studies, mostly on an "as-needed" basis. As a result of these studies, half of respondents (50 percent) report "moving inventory among warehouses" as it is the easiest and quickest option among all the other network improvement actions. For those adding DCs as a result of these studies, most cite "improved customer service" (70 percent) and "the penetration of new markets" (36 percent) as their top two drivers.



Tracking previous trends

Recycling continues to dominate sustainability efforts at 76 percent. This year however, slightly more respondents are "reusing shipping containers" and "using metal and/or plastic pallets."

Derewecki notes that he's seeing more plastic pallets in use at pharmaceutical manufacturing because of FDA requirements. "Wherever you have a requirement of a sterile or cleanroom environment, then that's one good way you can use reusable plastic pallets."

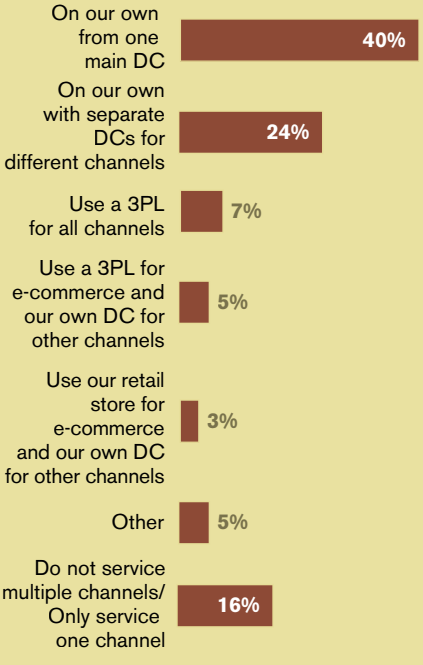
Fortunately, fewer respondents (only 15 percent versus last year's 28 percent) experienced catastrophic events this year compared to last year. Open-ended responses show many operations being hit by hurricanes and tornadoes; but to protect against these particular threats, survey takers have installed back-up generator and data retrieval systems, set plans in place to re-route demand to another DC, and have established multiple sources for parts and raw materials.

To reduce operating costs, "improving warehouse processes" (64 percent) and "improving inventory control" (61 percent) remains the top two actions preferred most by respondents. "It makes sense because both do not necessarily involve a high level of investment," says Derewecki. "However, the better operators have already done all the process improvements that they can do without making capital investments. They are at the next stage. To improve, they may need to invest in mechanization and automation."

Maida Napolitano is a Contributing Editor to Supply Chain Management Review

Market channels serviced by company

How multiple channels are being fulfilled



Source: Peerless Research Group (PRG)

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