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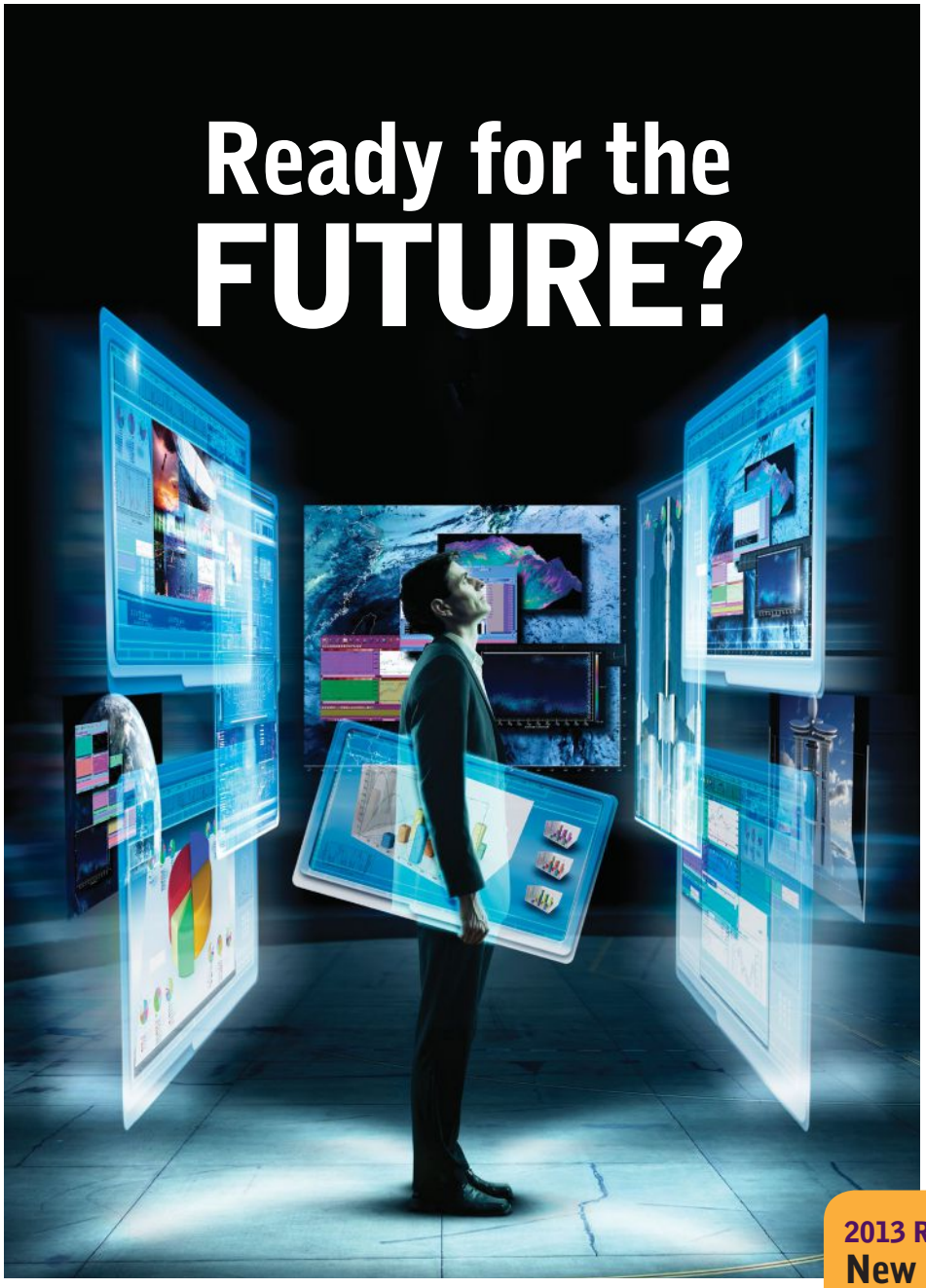

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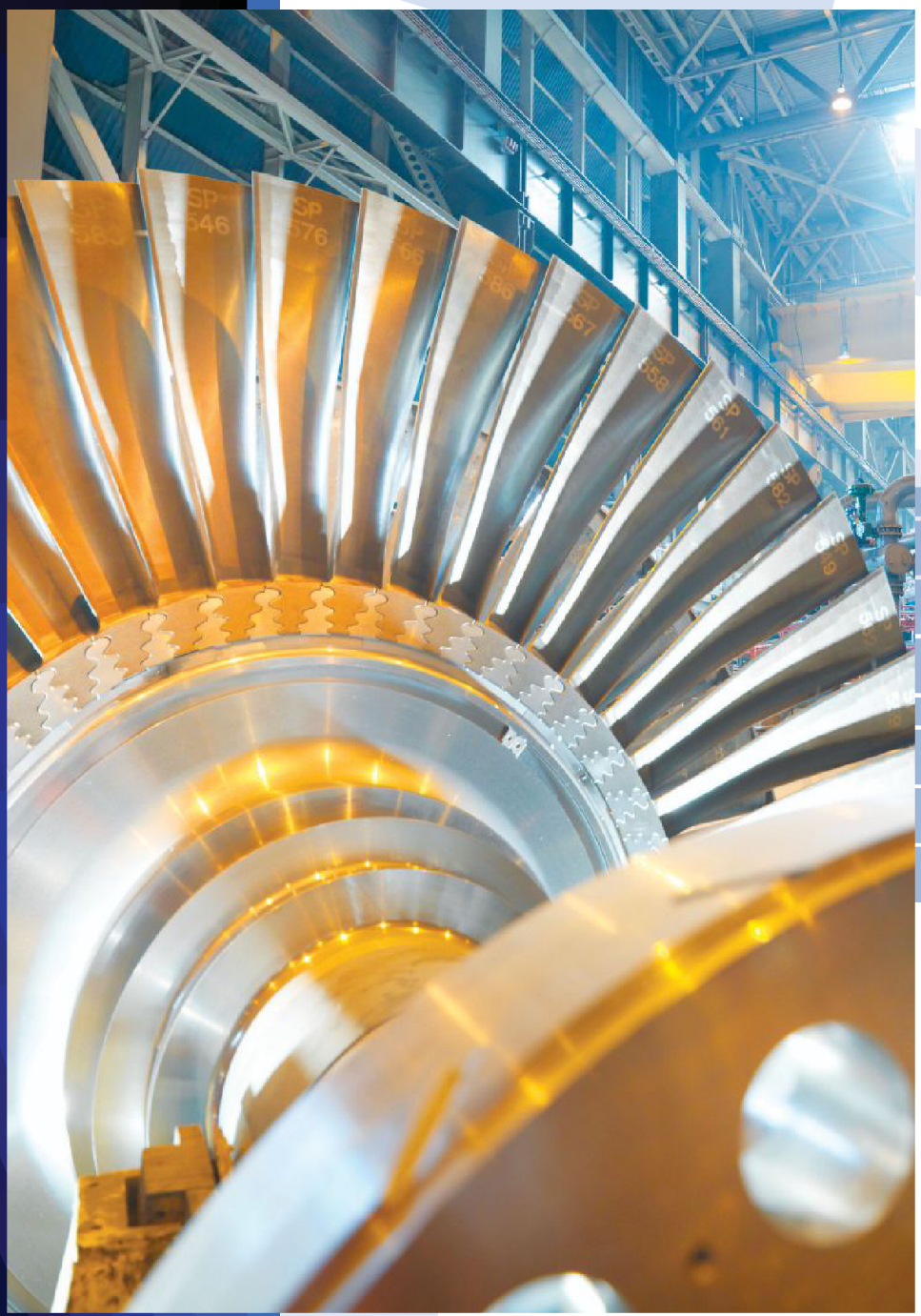

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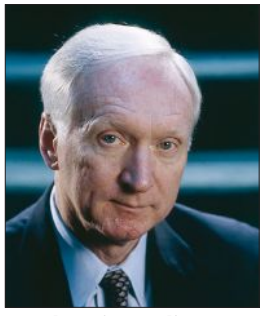
A Future Full of Promise



Frank Quinn, Editor
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January is a natural time to think about the future. It's the beginning of a new year, a chance to refresh and refocus on the tasks that lie ahead. More often than not, that vision is for the shorter term—in our case, what's coming up in the next 12 months that will affect supply chain professionals. But in this first issue of *SCMR* for 2013, we present a longer term vision of the road ahead.

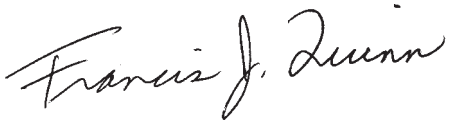
Our front cover asks if we're "Ready for the Future?" It's a complex question, one that's best addressed in parts. One part certainly has to do with the managerial and leadership skills needed to succeed in the job going forward. In their feature article on tomorrow's leadership challenges, Edgar Blanco and Chris Caplice of MIT's Center for Transportation and Logistics argue that a first step in developing the necessary skills is to understand that the skills themselves will change.

For this reason, supply chain leaders need to continually assess global trends and market dynamics—and work on developing the appropriate capabilities in response. This, in turn, demands great agility. Responding in an effective manner will benefit the organization, the supply chain executive himself or herself, and—perhaps most importantly—the future supply chain leaders. In this regard, the MIT authors offer specific strategies on developing the leadership pipeline.

Many of the challenges that supply chain managers will encounter will likely prove immune to the solutions of the past. What's needed in such cases, write veteran supply chain observers Robert Sabath and Rich Sherman, is some innovative thinking. Put another way, the "rules" need to be broken. These are the conventional practices that have become part of the accepted supply chain body of wisdom. Understanding which rules to break—and when—can lead to breakthroughs unattainable through traditional approaches, they say.

Technology, of course will play a central role in the supply chain of the future. We get a glimpse of the possibilities in the article on HP's intriguing approach to visualizing its supply chain. Called "Geographic Analytics," it's a way of mapping relevant distribution locations as part of the network optimization process. As the HP executives relate in their feature article, Geographic Analytics is a fast and effective technique for supporting tactical and strategic decision making—without having to wait for the heavy duty, more time consuming data-driven analytics.

One thing we can say with certainty about the supply chain future: It won't be boring. I've always maintained that from an editor's perspective the supply chain (and before that logistics) was among the most compelling of the business disciplines to cover. And I've always considered myself fortunate to be part of it. I'm sure that our readers feel the same way about supply chain management as practitioners of that art and science. Whatever the future holds, best wishes to all of you for personal and professional success in 2013 and beyond.



SUPPLY CHAIN MANAGEMENT REVIEW

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BY LARRY LAPIDE

Stay on the Course on Oil Efficiency

Supply chain managers need to persevere in their efforts to reduce energy costs. The Era of Cheap Oil is not returning any time soon.

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

This column represents my annual oil update, which I've been writing since the 2007 January/February 2007 issue of *SCMR* (see "Is Your Supply Chain Addicted to Oil?"). Then as now, it's meant to encourage managers to squeeze oil out of their supply chains.

This latest update is dedicated to Charles L. "Chuck" Taylor Jr., who passed away unexpectedly last year. Chuck was my "partner-in-crime" in constantly heralding that the Era of Cheap Oil had ended. We first met at a planning meeting for the 2006 annual CSCMP conference. I had recently launched the MIT Supply Chain 2020 Project. As part of that effort, the team at MIT evaluated significant trends that would affect supply chains in 2020—the long-term rise in oil prices and volatility being identified as one of the most important.

At the meeting, Chuck pointed out that the draft plans for the conference sessions did not include anything about the rising oil prices that we started seeing in late 2004. He believed that we were fast approaching Peak Oil—that is, a time at which the world will have reached a peak in oil output. Chuck was passionate—evangelistic, really—about the importance of making the supply chain community aware of this situation so that they could prepare for it. We both successfully argued for including oil as a topic at a plenary session during the conference. We participated on a panel with two managers from Dell and Mars, discussing the impact of increasing oil prices and what this meant for supply chains.

After that session, I went on to address this topic annually in this Insights column. After a long and successful career with logistic providers, carriers, shippers, and consulting firms, Chuck went on to found Awake! Consulting, whose mission was to educate the industry about the implications of the end of cheap oil. In 2010 he received CSCMP's Distinguished Service Award; at the presentation ceremony, his effort to spread the word about oil was cited as one of his many important contributions to our profession.

I last saw Chuck, several months before he passed away at a talk he gave in the Boston area. We chatted a bit at the dinner table and his last words to me were: "Keep writing about oil." So I am.

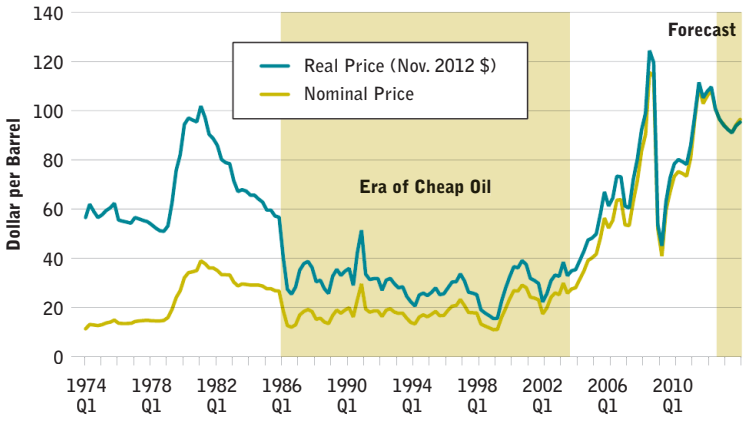
An Update on Oil

Exhibit 1 depicts quarterly imported crude oil prices from the U.S. Government for almost 40 years. It represents the most recent update to the exhibits I've been showing since my 2007 column. Denoted on the chart is the Era of Cheap Oil, which lasted almost 20 years. During that period "real" (i.e., deflated) oil prices bounced around from $20 to $30 per barrel. That period also happens to overlap with what I would call the heyday of the SCM evolution that began in the mid-1990s. It was during this timeframe that companies really started to embrace the integration and globalization of supply chains.

As I write this column, crude oil is trading at around $89/barrel having recently taken a slight dip attributed to concerns about a future slow-down of the world economy.

EXHIBIT 1

Quarterly Imported Crude Oil Price



Source: EIA Short-Term Energy Outlook, October 2012

While this recent price is a significant drop from the $100-plus prices of the prior year, it must be noted that the relatively lower price is happening in a less-than-robust global economy, especially with regard to Europe. Meanwhile, real prices are still three to four times higher than they were during the Era of Cheap Oil. Once the economy starts growing more robustly around world, prices will certainly rise again as developing countries put more demand against an oil supply that is getting more expensive to extract from new types of sources.

The International Energy Agency has reported that "a shale oil boom will help the U.S. overtake Saudi Arabia as the world's largest producer by 2020" (*Wall Street Journal*, Nov. 13, 2012). The agency also said that natural gas will surpass oil as the United States' largest source of fuel by 2030. So the report makes it seem like the future looks rosy for supply chains, which are heavily dependent on oil-based energy and materials. Prices might be held in line and possibly even go down in the long-run. However, as the *WSJ* article points out, this is not likely!

The reality is that oil prices are dictated by a global market, and U.S. domestic oil is expensive to extract. Looked at another way, the reason that the U.S. can become more oil independent is that oil prices have reached the threshold levels needed to make a profit from extracting oil from shale and deep water drilling—both risky and expensive methods. Further, the country's shift away from oil dependence will not mitigate the long-run increase in oil prices for U.S. companies because many of them have global, not just domestic, supply chains.

In February 2012, Navistar and T. Boone Pickens formed a partnership intended to get more liquid natural gas (LNG) heavy truck usage in the U.S., taking advantage of the future abundant supply of natural gas from shale. Navistar is planning to offer a natural-gas option on almost all of its trucks by the end of 2013. Even the most optimistic, however, would agree that for the next decade much of the U.S domestic fleet of trucks will still depend on diesel fuel rather than on LNG. There are two reasons for this (1) Navistar and the other truck makers would have to produce better long-haul trucks that run on LNG and (2) it would take a long time to replace the current distribution system of diesel fuel with stations that dispense LNG.

Guidelines Going Forward

To summarize, while there has been some good news for the U.S. in terms of becoming more oil independent, supply chains will continue to be fueled primarily by oil-based materials and energy sources certainly until 2020. Moreover, the Era of Cheap Oil is never coming back, despite the positive news on the continuing availability of oil and its natural-gas replacement. Availability has never been the big concern. It's always been evident that for the right price, oil can be extracted somewhere in the world. In fact, higher prices are making the U.S. become less dependent on imported oil.

This means that managers will still need to continually wean their global supply chains away from oil in order to mitigate the rise in oil prices and volatility. So what should they be doing to reduce the dependency on oil?

Basically they have to continue to slow down their supply chains, moving from those practices implemented during the Era of Cheap Oil that minimized costs and inventories to those that will minimize costs and energy inefficiencies. Below are a few guidelines to follow in this regard, with the caveat that some are purposely exaggerated to be provocative. But before you categorically reject them, at least give them some careful consideration.

Don't overpromise, unless absolutely required. Suppliers always try to please their customers when it comes to promising a delivery date. And often, whether or not a customer is asking for it, suppliers promise the shortest lead times. This tightly constrains operations and provides no leeway to optimize costs and energy efficiencies. The slightest disturbance that might cause a delay

will force a supplier to do things that are less energy-efficient, such as schedule an emergency production run, expedite a delivery using premium freight, and order emergency shipments from their suppliers.

Make and hold finished goods close to customers. In general, inbound shipments are bulky, and ought to use transport modes that are less costly and more energy efficient. On the other hand, finished goods shipments are not bulky and have shorter lead times; thus, they typically require more costly and less energy-efficient transport modes. During the Era of Cheap Oil many companies outsourced their finished goods manufacturing to Asia, which resulted in these products being moved over long distances. With expensive oil, this is energy inefficient and costly. Recently, some European and American companies have started to move their manufacturing to domestic locations or are near-shoring to get finished goods closer to point of sale or use. While politicians celebrate that such moves bring jobs back home, that is not the main reason for them. Expensive oil is a major driver as well as the recent rise in disruptions along global supply lines.

With expensive oil, this is energy inefficient and costly. Recently, some European and American companies have started to move their manufacturing to domestic locations or are near-shoring to get finished goods closer to point of sale or use.

Use air transport for people not goods, and choose rail for moving goods over land. Airfreight is the most expensive and oil-inefficient method of moving goods. Thus, airplanes should primarily be used to move people. Goods should be moved via ocean freight over water and by rail over land (or at a least via full truckload). Granted this guideline does not make sense for all goods, regardless of the cost of oil. Fashion goods are high-margin and can quickly lose their window-of-sales opportunity if they are not on the shelf when demand is high. Similarly, higher-margin high-tech goods can become obsolete before they hit the shelf; still other goods will perish during a long ocean voyage. That said, most companies that have products with these characteristics also have other products without them. A best practice is to evaluate each good to see whether the guideline should be followed. Victoria's Secret is a good example: from Asia, it flies fashion goods (about 40 percent of items) and ships the "basics" (e.g., everyday lingerie) via ocean freight.

Constantly review and revise all JIT programs. JIT programs traditionally worked extremely well for Japanese manufacturers because their suppliers were clustered close to plants. U.S. automakers, though, always struggled to replicate the Japanese JIT success because their supply chains were not clustered and supply lines were longer. Some American manufacturers had to deploy inventories stateside to buffer against delays in shipments coming from Asia. The objective of JIT programs is to minimize inventories. Most JIT implementations frowned upon deploying any inventories at all, despite the fact that one of the most useful purposes of inventory is to buffer operations so that upstream glitches do not impact downstream operations. Strict JIT programs can be too tightly wound because whenever a glitch happens along a supply line, a company likely expedites goods (e.g., flies them over water), which is costly and energy-inefficient.

Minimize the whipsawing of upstream operations. Many managers believe that it is better to plan more often. They continually shorten planning cycles—for example, by conducting more S&OP meetings. The intent is to keep supply better aligned to changing demand. As part of this demand-driven philosophy, plants are forced to shorten production runs, which involve more setups and changeovers. While this may keep inventories low, the end results are often more costly and energy inefficient than if manufacturing had been allowed to execute smoother production plans. In addition, changing plans more frequently can lead to emergency production runs, material shipments, and deliveries. Generally, managers should not change plans too often unless the changes are really significant, absolutely certain, and make sense when looked at from a cost and energy efficiency basis.

The above guidelines ought to be followed if you are serious about squeezing oil out of supply chains. These guidelines may not apply in each and every situation. The point is that you should strive to make all supply chain decisions based on an analysis that incorporates oil-based energy efficiency as a key consideration. I'm sure that if Chuck Taylor were still alive today he'd agree with this advice, in his 200 percent evangelistic style!

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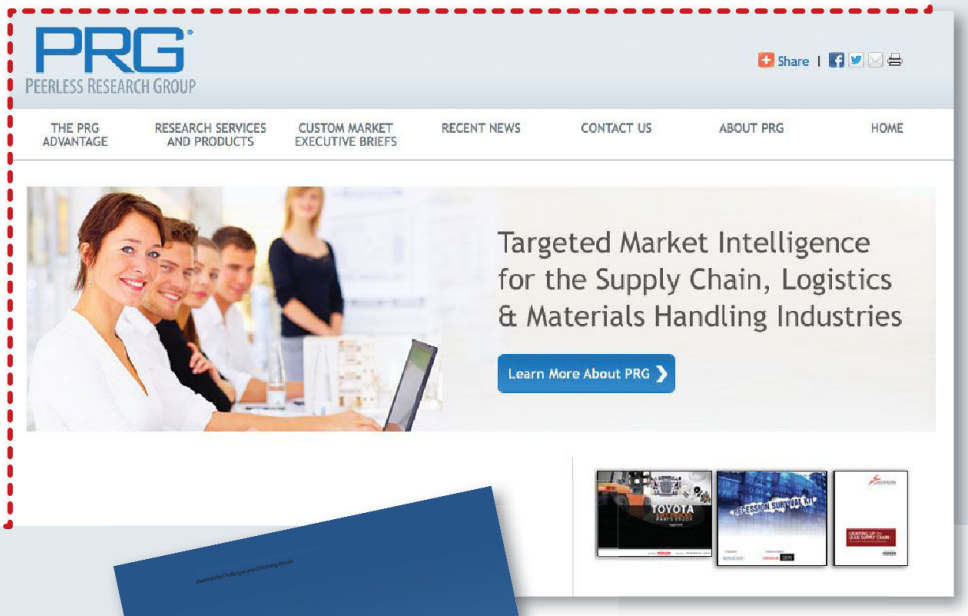

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BY PATRICK BURNSON

U.S. Manufacturers Should Seize the Moment

The global challenges facing supply chain professionals in 2013 also represent a great opportunity to move their companies forward.

By Patrick Burnson

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

Supply chain professionals have their work cut out for them this year, if a recent assessment of U.S. shipper sentiment is any indication. According to the National Association of Manufacturers (NAM), the number of shippers with an optimistic outlook about the future of their companies has dropped by nearly 40 percent since the beginning of 2012.

The survey finds that the recent slowdown in manufacturing activity, coupled with uncertainty caused by the poor business climate, are having significant negative effects on businesses throughout the United States. The global links implications should be obvious from these survey findings:

- Only 52 percent of manufacturers are either somewhat or very positive about their company's outlook today, vs. 89 percent who held this optimistic view in the first quarter of 2012.
- Expectations for sales over the next year also dropped, from 4.7 percent last March to just 1.0 percent today.
- Manufacturers' predictions about future capital spending and hiring turned negative for the first time since the fourth quarter of 2009.
- The prospect of higher taxes and reduced spending caused almost two thirds of manufacturers to reduce their business outlook for 2013.
- Almost 89 percent of manufacturers want the top priority of the second Obama term and the 113th Congress to be a long-term budget deal that tackles the deficit and debt.

Worst May Be Behind Us

Economists with IHS Global Insight came to roughly the same conclusions about the manufacturing decline, but provide some reason for restored optimism. In its Top 10 Predictions for 2013, IHS declares that "world growth will stabilize in 2013."

After steadily slowing down from 4.2 percent in 2010, the growth rate of the world economy will hold steady at 2.6 percent in 2013, IHS says. Moreover, the stage will be set for a modest acceleration of growth in the latter part of the year and during 2014. This cautiously upbeat outlook is predicated on the expectation that: (1) the massive monetary stimulus put in place in many key economies over the past 18 months will have some positive impact on growth and (2) the current episode of "extreme uncertainty"—related to the U.S. fiscal cliff, the Eurozone debt crisis, China's growth, and instability in the Middle East and Africa—will become less intense, and that worries about many of these risks will diminish.

Indeed, the IHS economists maintain that the dynamics for a gradually accelerating U.S. recovery are already in place. The balance of forces affecting U.S. consumer spending have turned positive. Finally, housing is showing signs of life, and can be expected to keep improving over the next year. As global growth begins to reaccelerate (albeit gradually), exports will follow suit. Last but not least, as the uncertainty about the fiscal cliff and deficit/debt reduction is resolved, U.S. businesses

are likely to spend and hire more. This means growth will average around 2 percent next year.

At the same time, recent policy actions by the European Central Bank and EU governments have reduced the financial risks related to the Eurozone sovereign-debt crisis and helped to reduce long-term interest rates in the hardest-hit economies.

And China's economy will slowly gain momentum, says IHS. Since 2010, it has decelerated significantly, with growth falling from over 10 percent to around 7.5 percent. Fortunately, there are already signs that the slowdown has bottomed out and that a gradual pick-up in momentum is in the offing. This trend will likely continue in 2013. Modest stimulus seems to have been effective in limiting the depth and duration of the domestic demand downturn.

IHS also predicts that the risks facing the global economy will be more balanced. Over the past year, these risks were skewed to the downside. In 2013, not only will some of the big-four threats—another U.S. recession, a Eurozone meltdown, a Chinese hard landing, and a war in the Persian Gulf—become less menacing, but there could be some upside surprises as well. Chief among these is pent-up demand from consumers and businesses. In the wake of the Great Recession and subsequent Great Stagnation, households and companies have been very cautious about their spending, preferring to save more and reduce their debts. There is some evidence that this process may be winding down, especially in the United States and parts of Asia.

Supply Chain Challenge

Casting aspersions on past federal policies—while sometimes justifiable—is not likely to result in positive change. NAM constituents lay out good reasons for their pessimism, but we are inclined to prefer the optimism contained in IHS findings.

And while the U.S. government may be charged with restoring certainty and implementing pro-growth business policies in 2013, supply chain specialists suggest that there's much our community can do to sustain the turnaround once manufacturing traction is gained.

Rising levels of demand volatility along with more complex, global supply networks is changing the paradigm for supply chain organizations in terms of resiliency and responsiveness. Analysts for IDC Manufacturing Insights note that product and process agility and speed necessitates that manufacturers become "massively multidimensional." IDC characterize this as the ability to leverage flexible factories, postponement techniques, segmentation, and profitable proximity sourcing to meet the diverse product needs of customer and consumers who increasingly look for personalization in their purchases.

Manufacturers poised for growth—with or without government incentives—are advised to pay close attention to the following 10 predictions from IDC:

1. Resiliency becomes a priority for end users looking to master "massive multidimensionality.

2. On the supply side, recognizing the inherent cost of lead-times, manufacturers continue to look at global networks through the lens of both regional and country-level sourcing.

America's manufacturers and the supply chain professionals in their organizations should begin to consider a shift in focus from the factory to the holistic supply chain.

3. On the demand side, recognizing the need for better service levels and mass customization, manufacturers look again to postponement techniques and data analytics to drive more effective customer insights and "smarter fulfillment."

4. End-user IT organizations will have to support a more productive supply chain ecosystem.

5. Service excellence becomes a strategic priority.

6. Supply chains will optimize omnichannel customer service and cost by enabling trustworthy, efficient and effective supply chains.

7. End users will focus efforts to improve collaboration both upstream with suppliers and downstream with customers to better compete in a faster world.

8. Supply chains will invest in technologies that enable visibility, visualization and virtualization.

9. The supply chain gets "smarter."

10. The big data era dawns for supply chain organizations.

As with most transformational events, "seizing" one moment, means parting with the past. America's manufacturers and the supply chain professionals in their organizations should begin to consider a shift in focus from the factory to the holistic supply chain. This means embracing disciplines ranging from demand management to distribution logistics. It also requires manufacturers to build resilience into their master schedules and capacity plans. At the same time, political agendas—no matter how compelling—should not favor restraint when aggressive growth is clearly needed to restore and rebuild eroding international linkage with this nation's foreign markets.

TALeNT STRATeGIES

The Psychology of Risk

By Ken Cottrill and James B. Rice, Jr

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Supply chain practitioners make countless decisions every day without really understanding the mental processes that underpin their choices. Recent studies on these cerebral interactions have shed light on the psychology of risk, an emerging factor in risk management decision making.

Operations leaders can help their teams—and themselves—to make more informed decisions and avoid common errors of judgment by being aware of these psychological influences.

The implications were discussed at a symposium titled Advancing Supply Chain Risk Management: Emerging Challenges and Strategies, which took place on the MIT campus in Cambridge, Mass., on October 10, 2012. More than 30 organizations attended the event, which was co-organized by the MIT Center for Transportation & Logistics and the Supply Chain Risk Leadership Council (SCRLC).

Beyond Knee Jerks

To some extent, weighing the pros and cons of a situation and deciding on a reaction is an involuntary process, orchestrated by a small, almond-shaped bundle of cells called the amygdala. Buried deep within the brain, the amygdala is responsible for the famous "fight or flight" response to threats. This gut reaction is an essential part of our natural survival kit, but when a more measured response is required, it can lead us to make faulty decisions.

The role of this ancient nerve center is described in more detail in the book *How Risky Is It, Really?* by David Ropeik (McGraw-Hill, 2010). Much of the discussion about the psychology of risk at the roundtable was based on ideas from this book.

In addition to the influence of the brain's wiring and chemistry, the life experiences and lessons that everyone carries around with them also impact decision making. While this mass of information defines us as individuals, often it is not enough to make fully informed and balanced decisions. Even data-driven professionals such as supply chain managers can be swayed by this subjective influence.

Do you have the facts at your fingertips to, say, decide whether using pesticides or driving while texting pose the more serious threat to public health? When asked, you may well have an opinion. But lacking the time to amass all the relevant facts and figures that opinion is invariably based on incomplete data and the intricacies of your personal mental map.

Logical Limits

This restricted view of life is called Bounded Rationality, and it affects decision making in a number of ways.

For example, in order to deal with complex situations and data, the human mind tends to simplify the task by categorizing the inputs. This helps to make the decision process manageable but does not always result in the best outcome. When dealing with complex risk, we tend to categorize or lump risks together in the same bucket based on characteristics such as industry or location that may have little to do with the threat level. Instead, we should be using risk-associated factors to segment ways in which supply chains can be disrupted.

Perhaps several years ago you had a bad experience with unreliable suppliers in a specialized sector of another industry, for instance. If you now have to source in the same sector, you will probably be doubly cautious having mentally categorized that sector as untrustworthy. But such an assumption may prevent you from properly evaluating the current risk based on pertinent operational criteria.

As professionals, we like to think that we dis-

passionately analyze every choice according to its own distinct merits. Yet these choices are often affected by how the relevant information is classified in our memory banks and how it is presented to us.

Anchoring and Adjustment is another mental shortcut we use that can introduce unwanted biases into the decision making process. An anchored value can be a figure we have retained in our heads that we unconsciously use as a point of reference when evaluating risk. But the front-of-mind figure is out of context when used to gauge an entirely different risk situation. A meeting to discuss the results of an evaluation study, say, may be dominated by one of the quantitative findings. You might walk away from the meeting with that figure implanted in your mind, and later on automatically use it as a reference when weighing a different set of options.

Faulty Perception

In addition to these Bounded Rationality behavior patterns, humans have developed what Ropeik calls "psychological shorthand for quickly sensing what's scary and what's not." We use these psychological factors, known as Perception Factors, to instinctively judge the character of a risk while we are consciously considering the associated factual data.

Trust is one of these factors, and it has a powerful influence on the way we view the world. Certain inputs, such as an angry face, immediately put us on guard as our survival instincts kick in. But there are many other facets of trustworthiness such as our political leanings—we tend to invest more trust in the opinions of politicians from our camp—and experiences that impress us.

Organizations are particularly prone to gaining and losing trust. A trucking company that fails to meet a very important delivery window makes matters worse by not admitting to the mistake and failing to acknowledge the gravity of the situation. At the shipper end, the supply chain manager mentally downgrades the carrier a few notches on the trustworthiness scale. The next time the manager has to decide on how to allocate loads, the decision will inevitably be colored by the negative experience. Yet it may be relatively easy for the trucking company to avoid this pitfall by taking corrective action.

Another example is the Risk Versus Benefit factor, where we focus on the benefits of a situation and downplay the associated risks. A supply chain illustration might be opting to take the benefit of lower costs and higher profits by outsourcing a manufacturing operation to China, while downplaying the harm to customer service.

In addition to these psychological influences, we are susceptible to building an Optimum Bias into decisions. A general example is buying a lottery ticket even though the chances of winning are remote at best. Has your innate sense of optimism ever nudged you into, say, adding inventory, even though the chances are that a demand spike will not materialize as expected?

Control is a Perception Factor that can figure prominently in the supply chain domain, too. Sourcing from a supplier you have been working with for some time may give you a sense of control, for example, but to what extent are you dismissing other, more cost-effective opportunities that are less familiar?

Joining Two Minds

Though this article has barely scratched the surface of the psychology of risk, we hope it has given a taste of how our mental makeup and decision processes can sway the choices that we make.

Effectively linking the two sides of the corporate brain—the emotional/perceptual and the analytical—is a sure route to better decision making.

Supply chain practitioners need not become experts in the field. However, even a working knowledge of these psychological factors can improve decision making, and help managers to better deploy talent. The central issue is that decisions are not only based solely on facts and figures, but also on less tangible, much fuzzier emotional and attitudinal influences. This can be easy to overlook in a profession such as supply chain management where we put so much emphasis on data-driven analysis.

One attendee at the risk roundtable explained that the emotional/rational divide can also create tensions within the organization that impedes effective decision making. As part of an umbrella risk management program in his company, the attendee noted, senior executives are asked what challenges worry them the most. Their answers tend to be largely subjective, being based on how these individuals perceive threats to the company. But their feedback is frequently at odds with the data-based answers given by supply chain management to the same question.

As is the case at the individual level, linking these two sides of the corporate brain—the emotional/perceptual and the analytical—can be a major challenge. But making the connection is a sure route to better decision making.

Want to Innovate?

The supply chain discipline is replete with rules that most managers live by. But in certain cases, true innovation and breakthroughs come only when those conventional rules are broken. By clearly understanding the nature of the rules and the details of your supply chain, you can better determine where and when rule-breaking makes sense.

By Robert Sabath and Richard Sherman

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From college courses to on-the-job training to professional seminars, we're taught that supply chain is a complex set of processes that follows specific rules to achieve the best results. Yet most supply chain innovations and breakthroughs evolve from situations where the basic rules were actually broken or changed. Is there a disconnect?

Breaking the rules has to do with knowing when it's beneficial to make an exception to accepted practice or to challenge the conventional answer. It entails scanning the horizon for new technologies, best practices, or approaches that change the paradigm of how we do things. Winning companies often excel because they saw a situation differently and were willing to take the risk and the initiative to break with the accepted logic. Innovation is all about breaking the rules. If you don't look outside the box, you will become imprisoned inside it.

The challenge for management is first to create a culture that looks outside the box. Once that's in place, supply chain executives can identify which rules should be broken or challenged and how; when the timing is right; what specific actions need to be taken; what are the economics and operating levers; and how to harvest the benefits after the rules are broken. Breaking the conventional supply chain rules is not the right strategy in every instance. But when it does make sense, it can lead to truly breakthrough results.

The real secret to successfully breaking the rules is to know the rules intimately in the first place. When you understand the foundation of a rule, you better understand the logic and the strategy upon which the rule is based. That yields a much clearer sense of which rules restrict rather than support your supply chains.

Below we address five time-honored supply chain "rules" that need to be challenged—not necessarily broken, but at least carefully analyzed to see if a departure from the rule makes sense for your organization. Each segment concludes with a brief recommendation on how to approach the particular rule.

Break the Rules

Gandee Vasan

Rule 1: Supply chain is not strategic.
Historically, the supply chain has been considered one of the least strategic corporate functions. Its nuts-and-bolts reputation evolved from its transportation and warehousing roots. While much has been said about the supply chain's strategic value, comparatively little has been done to back up the words. Certainly, the development of advanced information systems, material handling technology, sophisticated order management and customer intelligence systems has improved supply chain operations dramatically. And procurement, manufacturing, and logistics functions are becoming increasingly more integrated—with some even reporting to a Chief Supply Chain Officer (CSCO). Yet, our research and experience finds that most companies still view their supply chain mostly as a cost of fulfilling demand.

If we are going to be innovative, we need to challenge the notion that supply chain activities are primarily a

tactical cost lever. The reality today is that supply chain is more than fulfillment operations. It has become the most critical link to the strategies and tactics of marketing, customer relationship management, and market and service segmentation. The most successful companies integrate their business, marketing, and supply chain strategies. In their view, cost is not the central focus of supply chain performance management. The strategic value of supply chain operations is in fullfilling the marketing strategy to delight customers and grow market share—not just fulfilling orders at the lowest cost.

Sam Walton of Walmart and Amazon's Jeff Bezos both got this. They understood the value of leveraging supply chain capability to delight a critical market segment, or to support an initiative that differentiates them from the competition, or to focus on the "big" economics (top line or total profit, for example) rather than traditional supply chain cost minimization. Bezos is often credited with developing the "Amazon Flywheel of Growth" on a napkin. The reality is when several senior executives from Walmart joined Amazon, they brought with them the concept of Sam Walton's "Productivity Loop," which Bezos then adapted to Amazon. (Exhibit 1 depicts the Flywheel and Productivity Loop.) The point is that for both Walmart and Amazon, value and service drive revenue growth; revenue growth drives efficiency, leading to more value and more customers; more customers drive more efficiency, value and growth; and the loop or flywheel continues to spin.

Winning companies often excel

because they saw a situation differently and were willing to take the risk and the initiative to break with the accepted logic.

Consider the growth and leadership of these two companies as well as CVS (among many others) whose ability to deliver their promises consistently and reliably is the backbone of their success. Each of these companies has changed a segment of the retail industry by developing better, deeper, broader supply chain service capabilities and promoting them as differentiators against a broad range of competitors. Walmart brought availability, selection, simplicity, and low cost to customers who had rarely experienced any of those benefits before. The entire Walmart model was built around consistency and reliability focused on maximizing margin per square foot, product availability, broad assortment, store consistency, and friendliness. To every characteristic, supply chain provided the resources, leverage, and capability to execute.

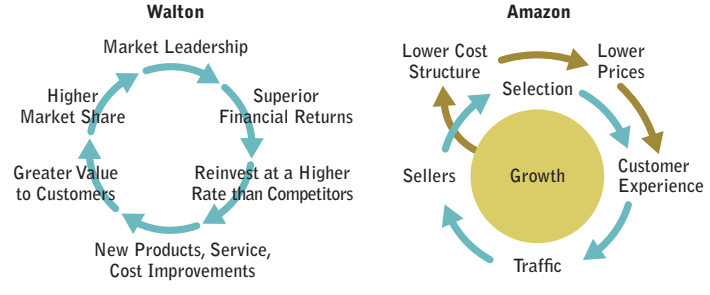
Amazon, by focusing on delighting its best customers and deeply understanding their needs while scouting for the next "best customers", has demonstrated that services that delight customers can produce dramatic growth in both the top and bottom line. The underpinning is the company's capabilities with regard to warehouse design and management, supply chain software development, and transportation management as well as the processes that interface these areas. Amazon's amazing business success flows from a strategy to maximize margin per box rather than from any singular focus on absolute supply chain cost reduction.

CVS is in the midst of what could be a sea change in "drugstore" retailing. By recognizing the value of the mail order market as it shifts to serve older adults, CVS has followed through with the strategy of acquiring the requisite fulfillment capabilities and linking them through supply chain strategy to its ongoing business. By understanding the strategic value of alternate distribution channels and linking them, CVS has repositioned itself as the market leader.

Rule Recommendation: The best results come from the strategic integration of supply chain with marketing and sales, with finance, with suppliers, and with customers. Moving from operational integration to strategic integration is tough; it's fraught with concerns of losing control and sharing sensitive information. Yet the dramatic breakthrough results of the leaders prove that the risk can be worth taking.

EXHIBIT 1

Walton's Productivity Loop and Amazon's Flywheel of Growth



Rule 2. All customers are created equal.

Most of us have heard this platitude throughout our careers; in fact, we often see it stated as a formal company policy. Consider the extremes, though, with respect to this high-sounding ideal. A company's most important customer usually earns that designation because it is large, has a big demand for our product, and has a continuing, profitable relationship with us. At the other extreme is a fair weather customer, one who buys our product sporadically, is hard to deal with, pays slowly, and is only very marginally profitable to us. The practices of the first customer allow us to carry minimum safety stock to cover its demand, and cycle stock to process and handle their demands on a largely routine basis. None of this applies to the second customer. Is this equality?

The truth is that customers are not created equal—but it takes insight to understand what that really means. In a nutshell, "all customers are created equal" often means that the worst customers get better service than the best. In the two opposite examples just described, the second customer, because of its sporadic demand and uncertain requirements, requires extra inventory and order processing and handling time. At its worst, this customer's volatile demand can actually steal inventory and responsiveness from the most important customer. In such cases (which are not all that uncommon, by the way), "all customers created equal" really can mean "best service for my worst customers."

Again, a disconnect between marketing and operations contributes to the problems associated with this rule. For operations, the biggest challenge often is understanding which customers are "best." Size, by itself, may not be the indicator of importance. Total profit contribution or long-term profit potential would be a better indicator.

Most of us are familiar with Pareto and the 80-20 rule (20 percent of our customers generate 80 percent of the business). Experience suggests that this rule is only the tip of the iceberg. In virtually all industries, a very small percentage of customers (often 5 percent or less) account for an amazing proportion of a company's profit (40 to 60 percent, or even more). Losing one of those customers can be disastrous, while adding one can make the company's numbers for the next year.

Market leaders look at the 80 percent of the customers that aren't producing much profitability and develop a strategy to grow them or lose them. Supply chain leaders also know this secret. This focus on customer profitability is often the driver of the world's best companies. In any case, finding and understanding which customers are truly most important will enable you to treat them so well that the results will be exceptional.

Think about the heyday of Dell computers, when the company gained spectacular market share by breaking the "all customers are created equal" customer service rule. By building channels, capabilities, and systems that provided different levels and packages of service to each segment—as determined by the segment's profitability—Dell had the full range of customers singing the company's praises in harmony, even though the melodies that each segment heard were unique. And today, as Dell's customer base and market segments are shifting with changes in the personal computer market, Dell is challenged once again to rethink and reshape its supply chain strategy to meet new customer segments and requirements.

If we are going to be innovative, we need to challenge the notion that supply chain activities are primarily a tactical cost lever.

Rule Recommendation: The best results come when supply chain operations fully understand the needs and requirements of different segments and customers. The leaders define their different supply chains to meet and delight the customers in the selected and targeted segments and build their supply chains backward based on serving the customers' requirements. Supply chain strategy is most effective when aligned with the company's market strategy.

Rule 3: Manage for minimum cost.

Supply chain is an operations-driven function. As supply chain professionals, we are schooled and trained in selecting the steps and executing them perfectly in order to drive costs out of the process. Yet in many situations, forgetting about costs and focusing on profit can produce

spectacular results. The two most successful retailers in the U.S.—Walmart and Amazon, who we introduced earlier—owe their success primarily to integrating their supply chain capabilities with their market strategy. Moreover, both achieved greatness because of their disdain for traditional supply-chain focus on cost efficiencies rather than value contribution.

Walmart grew by having "too much" inventory, while focusing on the prices customers pay rather than the margins generated from the traditional retailer supply chain. Sam Walton saw multiple retailers, each with their own store, selling different product categories. He believed that by extending the assortment across many categories (the long tail) in a single store, he could offer lower prices while increasing inventory velocity and the margin per square foot. In addition, he could further increase his margin by consolidating volume and leveraging his distribution function. Walton would make the investment if it would generate long term advantage.

Managers of the truly great supply chains recognize that cost minimization is a "nice to have" within the framework of the "must have" long-term health and success of the corporation.

Amazon, starting with an emphasis on books, has become the broadest and most dramatic supply chain and fulfillment company the world has ever seen. But importantly, its main focus is not on minimum cost but rather on consumer satisfaction. Founder and CEO Jeff Bezos has stated publicly that if customers are happy enough, the top line will grow fast enough and the bottom line will follow (even if it is a low percentage). By focusing on increasing the margin per box, Amazon supply chain management can look at increasing revenue per lane vs. reducing transportation cost per lane. Breaking the rule changes the game.

The leaders understand that corporate success depends on how well the supply chain is orchestrated within the corporation's vision and overarching strategy. Managers of the truly great supply chains recognize that cost minimization is a "nice to have" within the framework of the "must have" long-term health and success of the corporation. Supply chain executives have a responsibility to always recognize that supply chain is one of the few corporate areas entrusted to balance objectives rather than simply minimize them.

A major manufacturer of commercial air conditioners had focused on minimizing inventory and number of stocking locations. Over the years, inventory turnover increased substantially, and warehouses were reduced by two-thirds. Nonetheless, market share eroded as customers increasingly viewed the company as being non-responsive and old-fashioned. Recognizing that a large majority of sales were for replacement systems rather than new construction, management determined that fewer locations meant slower responsiveness to that part of the market that was not price sensitive but truly cared about availability. Thus, it tripled the number of warehouses and simplified product design for the replacement market, allowing for fewer SKUs to cover market demand. Although field inventory soared under this unconventional approach, the company gained 20 share points and profit doubled.

Rule Recommendation: The principle of minimizing cost is certainly valid, but it must be seen within the context of inventory availability and other supply-chain outcomes that can have a profound effect on the demand, sales, and price levels of your company's products. By understanding the intersection of marketing and operations and focusing on the customer to design the supply chain backward, that vision becomes clearer.

Rule 4. Always use optimization models to determine the location and level for manufacturing and inventory.

There are several methodologies used to make location decisions and many proven modeling techniques to work through the process. The analytics within most models generally follow the rationale that transportation costs go down with the number of locations, whereas inventory-related costs increase with the number of locations. The optimization process uses forecasts of product demand, inventory carrying costs, and transportation cost as its inputs.

Each cost arrives with its own challenges, however. For product demand, three to five year forecast data by geographic location and stock keeping unit are typically utilized. But such data are historically inaccurate—even on a near-term basis. For inventory carrying costs, computations include a company's cost of money, which varies with the prime rate and the company's economic situation, not to mention international exchange rates. For transportation costs, computations include fuel surcharges and lane volumes, both of which vary substantially from year to year. Uncertainty or volatility in sourcing, mode, and third party contracts also can have a

substantial effect on the model's outcome.

Given all of these factors, the "optimum" is rarely a clear finding. Most individuals think the graph of total cost looks something like a "V," with a clear minimum point. (See Exhibit 2.) However, almost always the graph is shaped something like an old bathtub with a very long, virtually flat center area. (See Exhibit 3.) Variation between what may be the minimum and perhaps 10 or 20 alternatives is far smaller than the variations caused by inaccurate forecasting and data volatility.

The following illustrates our point. A regional food manufacturer restructured its entire distribution system based on total acceptance of a highly sophisticated optimization model. Four years later, because of small shifts in customer demand and dramatic increases in transportation costs, its total supply chain costs had increased by 150 percent. At the same time, a competitor had looked at its new product rollout strategy and determined that they had virtually no idea of expected demand. The company president decided to "roll the dice," utilizing stocking distributors, specialized retailers, extra inventory, and several alternative transportation methodologies to cover the unknowns. Rather than trusting a model using highly uncertain "guesstimates," he invested in cushions that kept the evolving but uncertain customer segments satisfied. This apparently high-cost solution kept supply-chain costs level while effectively supporting the unpredictable patterns of new product growth.

Rule Recommendation: Use optimization models as rational guideline tools. However, trust only the ranges of the results and their consistency, rather than blindly accepting the answers as absolutes. Further, make sure the assumptions used in the model match the market conditions that you actually face. And, if you do use the models, consider multiple scenarios and use them frequently. All things change.

Rule 5: Ship every parcel order the day the order is received.

This misguided maxim evolved from a different era, when at one time the practice made sense. The truth is that parcels move fastest when they become truckloads, and taking steps to consolidate shipments can have a profound effect on the time—to say nothing of the cost—of a shipment. Effective supply chains are built around the total elapsed time of the order cycle, not the time of one event ("ship today"), even if it is an extremely visible activity.

To illustrate, a specialty Internet retailer of products to aid handicapped customers proudly promoted its same-day shipping policy. Yet company management could not understand why a competitor that clearly did not follow the same policy continued to maintain a competitive advantage. The competitor's positioning broke the rules: they had no interest in shipping every parcel the day it was ordered. Rather, they accumulated shipments within various geographic areas, combining them in truckloads, which in fact crossed the country far more rapidly than the small shipments. In addition, this approach avoided the higher rates associated with LTL or parcel shipments. Simply stated, the competitor that appeared less responsive actually made more profit and satisfied customers far more than the retailer. Effective management of consolidation can produce dramatic results—even if it runs counter to traditional thinking.

Also consider Amazon's Prime Customer incentive: free two-day shipping for an affordable annual fee. Why two day? By guiding its customers to a two-day shipping window, Amazon collects order, inventory availability, and cost information for each customer, distribution location,

EXHIBIT 2

Generally Accepted Total Cost Model

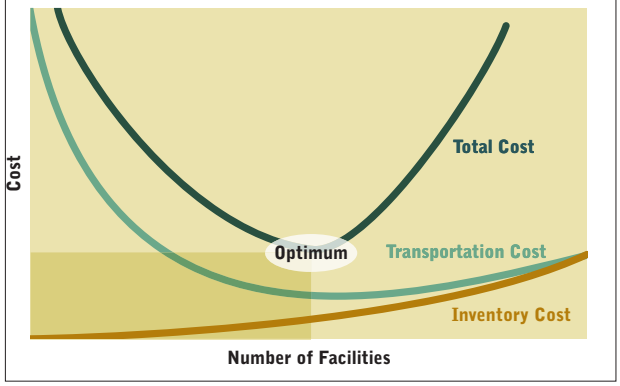
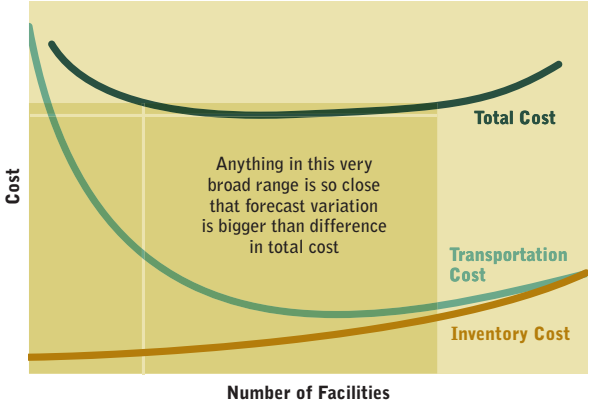


EXHIBIT 3

Realistic Total Cost Cluster



and shipping method in its network. Armed with this information, Amazon's optimization system can determine the best location to ship from at the lowest total cost. Employing a virtual inventory system that considers all inventory as one accessible resource, orders are consolidated, transportation optimized, and the volume concentrated along lanes to maximize line haul while minimizing parcel. As volume grows, margin per box grows with it.

Rule Recommendation: Often, the implications of promises made are unintended and undesirable. By clearly understanding the service effects of alternative actions, it is often possible to deliver more of what the customer wants at a cost that is surprisingly low. It is critical to understand the full impact and flow of decisions: what may appear to be optimum or at least desirable can easily have an opposite effect.

Which Rules to Break?

Which rules should you consider breaking? To answer this question, it's critical to understand the fundamentals and the assumptions behind the rules. For example, if the rule assumes a normal demand distribution, it may be appropriate to break the rule if demand is not normal. If a rule depends on level volumes, look out for spiky or seasonal volumes. If a rule is in response to an operating system or a customer or supplier relationship, challenge it if the system, the customer, or the supplier has changed. And if the rule relates to combined characteristics, prepare to challenge its application to individual ones.

It's also important to understand that rules flow from assumptions that are based on a point in time. Times change, technology changes, everything changes.

Economic Order Quantity (EOQ) algorithms are a great example of ever-changing assumptions that affect the rules. Just as customers are not created equal, neither are suppliers nor inventory items, nor manufacturing processes or cost. Variability in cost, demand, yield, lead time, capacity and the myriad constraints that comprise the assumptions made to calculate EOQ are always changing. Yet, many, if not most, companies use a single EOQ algorithm to calculate replenishments and their ERP systems don't recalculate the EOQ quantity on a regular basis.

Disappointingly, many companies have not documented their supply chain processes and practices. In fact, we find that most companies haven't even defined their supply chains. Yes, that's plural; companies usually have multiple supply chains. The supply chains differ based on the different product categories they sell and the different customer segments they serve. Hewlett Packard, for example, has different supply chains for servers, PCs, and printers as well as for different industry, business, and personal customer segments, not to mention geographic supply chains. As supply chains are defined and processes documented, management can more effectively benchmark performance and best practices.

By knowing the fundamentals and assumptions and by clearly understanding their supply chains, companies can more effectively review the process rules governing process performance, identify assumptions that may have been subject to change, and—most importantly—pinpoint which rules to "break" for improved performance. If you are looking to produce step-change results, you have to take the steps to understand, identify, evaluate, and innovate the processes. As our case examples illustrate, these results can go beyond financial improvement; they can be game changers that can lead to market advantage.

It is critical to recognize the conditions that suggest that breaking the rules may be in order. These could include, for example, new competitors in your market, changing customer preferences, rapidly changing technologies, service and warrantee difficulties, exceptional weather patterns, or unpredictable seasonality demands. In short, rule-breaking scenarios can come from any direction and take any form.

Most important, in deciding which rules to break you have to look across process boundaries. How are supply chain processes affecting and being affected by sales and marketing processes? Over the years, most of the breakthroughs and innovations we have observed resulted from companies managing the intersection of marketing and operations. Significant financial gains are made when all of the competitive levers are pressed equally. That's the lesson learned from Amazon, Walmart, P&G, and other market leaders. When you clearly identify the levers of growth and align their processes for competitive superiority, innovation and breakthrough results can be achieved.

Finally, be very sensitive to trading partners' technologies, priorities, and modes of business. In some cases matching them can provide immense advantage; in other cases what works best for them may be nothing more than a disruptor to you.

Overall, winners are those organizations that understand the "why?" as well as the "how?" of the rules that supply chain people follow. And, all the while, they look for the thin rays of light that occasionally shine between the thick absolutes of tradition that we are all expected to follow. Quite often, those rays of light are nothing more than their common sense screaming out: "In my gut, I know there's got to be a smarter way of doing things."

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The Leadership Challenge: Keeping Pace with the Skills Needed

By Edgar Blanco and Chris Caplice

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The skill sets required to manage global supply chains today are not the same as they were 20, or even 10 years ago. And they will be different from the ones required in 2010. It's almost impossible to precisely predict what leadership capabilities will be needed going forward. The best course of action: Be agile and ready to respond to whatever happens.

Supply chain management (SCM) is an evolving discipline. The art and science of managing a global supply chain has gone through a transformation in response to changes in the way companies operate as well as a more complex and interdependent business environment. Practitioners need to keep abreast of these developments and adopt the appropriate mix of leadership skills.

More specifically, as the profession continues to grow beyond its physical distribution roots, supply chain managers require both broader expertise and deeper technical excellence. How to reconcile these two seemingly opposing demands is one of the most difficult leadership challenges facing SCM today.

By tracing the profession's evolutionary track and changing profile, we can identify responses to these challenges and prepare practitioners for the leadership demands that lie ahead.

From Concept to Practice

The SCM concept first arose from the work of Jay Forrester at MIT in the early 1960s. Forrester noted that success for a company relied on controlling and managing the "interactions between flows of information, materials, manpower, and capital equipment." The first public use of the term Supply Chain Management did not occur until 1982 when Keith Oliver mentioned it in a *Financial Times* interview. (Exhibit 1, on page 22 depicts the evolution of SCM from idea to adoption.)

Adoption of the SCM concepts was slow but incremental

Brandon Laufenberg

throughout the 1980s as traditionally silo-ed distribution, logistics, and transportation departments started collaborating. The Continuous Replenishment Program initiated by Walmart and P&G in the late 1980s is a prime example of the nascent initiatives and programs that were beginning to take place.

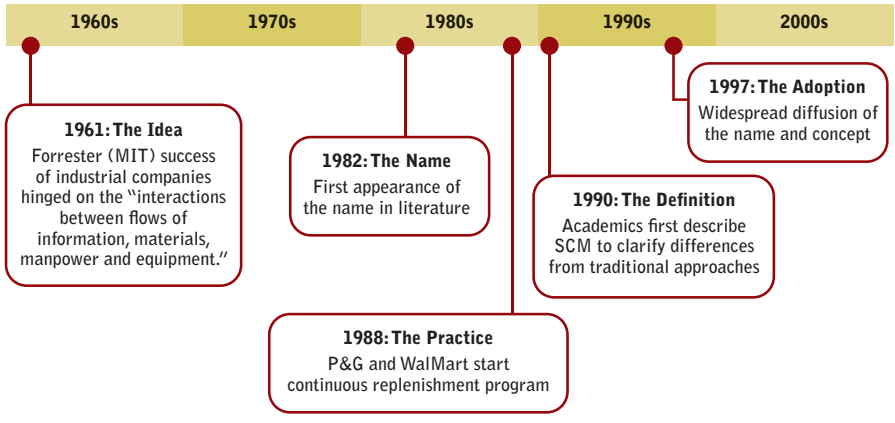
As is often the case, the academic community lagged the industry. Throughout the 1990s numerous universities created partnerships to formalize and flesh out this new integrated supply chain management concept. Consortia at MIT, Stanford, and elsewhere began clarifying the differences between older, more traditional logistics and the new supply chain practices.

In 1996, the consulting firms PRTM and AMR Research along with more than 50 manufacturers founded the Supply Chain Council. Over the next year, the organization developed and propagated the first set of comprehensive, cross-company metrics and approaches that track the information and material flows described by Jay Forrester 30 years earlier. The SCOR framework of Plan, Source, Make, and Deliver shifted the way companies considered and measured their extended operations.

SCM disciplines continued to become widely adopted throughout the 2000s. Today, SCM is considered common practice in North America and Europe, and, increasingly, in the rest of the world.

EXHIBIT 1

SCM: From Idea to Adoption



Source: MIT Center for Transportation & Logistics

Supply Chain Evolution and Organizational Structures

The acceptance of SCM as a discrete discipline has helped to revolutionize the way companies are organized and run. SCM has redefined the traditional view of the company as a set of independent functions that operate within established boundaries and rules.

This functional view of the world divided the product and information flows into independent responsibilities such as purchasing, inventory control, warehousing, materials handling, order processing, transportation (inbound separate from outbound) and customer service. Each of these functions received inputs from an upstream silo, performed some action, and sent their results to a downstream function.

This waterfall process between silo-ed functions was the norm. And it was relatively easy to manage; each function had very clear boundaries and metrics. Managers made decisions within their own four walls, and the complexity of these choices was defined by the limits of the available resources. From a decision-making perspective this silo-ed structure allowed each manager to focus on a simple objective function with few variables to consider and limited by many constraints. The constraints captured the various inputs coming from upstream departments and requirements arising from downstream functions.

As firms loosened these functional boundaries, departmental walls became more porous, making it possible, for example, for transportation to work with customer service to evaluate the impact of specific delivery windows. This new regime was enabled by logistics functional areas that looked at a wider range of trade-offs between the once silo-ed functions within the organization.

Managers developed cross-company communications channels. They were now able to provide feedback on the implications of their decisions to colleagues in upstream and downstream departments. Other managers could now build this information into their decision making. Supply chain partners were part of this cross-functional dialogue, albeit to a limited degree.

As the profession continues to grow beyond its physical distribution roots, supply chain managers require both broader expertise and deeper technical excellence.

In this freer environment the flaws in the silo-ed approach became apparent. Decisions made in one function were analyzed in terms of their impact on other functional areas; enterprises were becoming more complex and intertwined. What was once a constraint in the decision making process, now became a new variable.

When decisions have more degrees of freedom, they become more complicated and involve trickier trade-offs. Managers needed to engage with functions beyond their sphere of control. In some firms this was resolved by creating matrix organizations with dual-reporting structures designed to balance conflicting internal objectives.

These changes began to encompass the multiple partners and enterprises along the flow of product and information from initial manufacture to final consumption. The decisions made within the product design process (pertaining to materials, sources, packaging, and so forth) became critical issues for the transportation and fulfillment functions, for example. More and more peo-

ple, organizations, and perspectives, were included in the decision-making process.

As SCM expanded to include both suppliers and customers along the chain, these decisions became even more convoluted. The different decision makers were no longer under one roof or in the same company. In many cases, suppliers were also supplying competitors, and trading partners' goals were misaligned. Downstream customers (such as retailers) had differing strategies, objectives, and missions. The business functions needed to properly align with and reconcile this increase in complexity.

As managers engaged with extended supply chain partners, it became more difficult to exert direct control over operations. Internal organizational restructuring was less effective and required more "soft" skills than before. There was greater recognition of the need for persuasion, collaboration, and joint-design practices across the extended supply chain.

In its current form, SCM has flipped 90 degrees from a vertical, within-the-firm orientation, to a more horizontal flow that mirrors the flow of products, information, and money. Partners do not necessarily share the same culture, objectives, language, geography, or level of sophistication.

Global Shifts Reshaping SCM

These changes have not taken place in a vacuum. External developments have also reshaped SCM over recent decades.

Globalization has led to the dispersion of supplier networks across the world, for example, making collaboration with trading partners much more complex. The world order is now very different compared to 30 years ago. In 1982 China was the 24th largest trading partner with the United States—just behind Switzerland. Within a few decades it became the second-largest, just behind Canada. Trade flows have shifted both nationally and internationally in line with this economic reconfiguration, requiring companies to adapt their supply chains to the ever-changing commercial map.

At the same time, shorter product lifecycles for most consumer products have led to a proliferation of SKUs and generated even greater complexity in supply chains.

Other challenges that have emerged over this period include:

- Measuring the performance of a supply chain that crosses multiple entities that do not fall under the same control. End-to-end metrics are attractive and comprehensive, but it can be difficult to assign responsibility for measuring performance in today's globe-spanning supply chains.
- Making trade-offs between the various players in a supply chain. For example, how are the benefits shared among trading partners in the extended supply chain.
- Ensuring that each partner in a supply chain has visibility into inter-organizational product flows.
- Coordinating operations in markets or mega-cities with very different levels of economic development and varying levels of physical infrastructure.

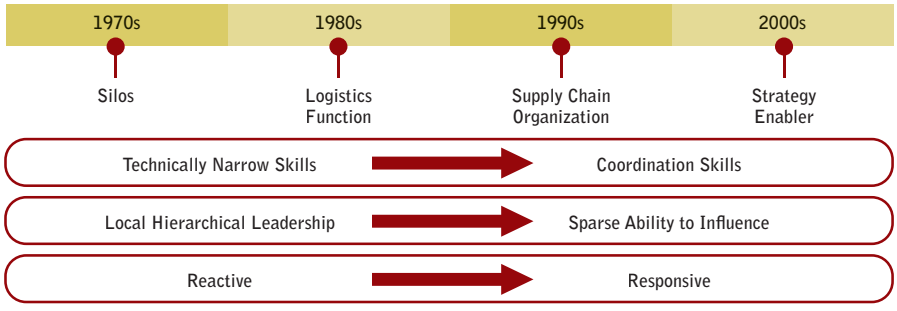
The SCM Response

SCM has responded in many ways to these changes and related challenges. The emphasis on silo-based operations that focus on product delivery and quality in the

1970s, and the cross-functional coordination that is characteristic of the 1990s, have given way to yet another role for SCM: that of strategy enabler. (See Exhibit 2.) Nowadays the profession is being asked to anticipate competitive challenges, obstacles, and opportunities.

EXHIBIT 2

The Evolving Discipline of SCM



Source: MIT Center for Transportation & Logistics

In effect, SCM has become both a shock absorber and a bridge. It buffers the firm against the impact of volatile demand, uncertain supply, and disruptions. And it serves as a bridge between the organization and its trading partners, including both suppliers and customers. With these dual roles (shock absorber and bridge) the profession has, by default, become responsible for ensuring that the company—and specifically its end-to-end supply chain—is resilient.

SCM has become both a shock absorber and a bridge. It buffers the firm against the impact of volatile demand, uncertain supply, and disruptions. And it serves as a bridge between the organization and its trading partners.

However, the move away from functionality towards strategy enablement requires SCM to adopt the skills, technology, metrics, and risk management disciplines needed to fulfill the new role.

To get a sense of this shift, consider the range and types of skills SCM leaders needed in the functional supply chain, compared to those required in the more strategic regime in which they now find themselves.

Horizontal communication. Traditionally, supply chain leaders were functional experts who were technically narrow and had little incentive to get to know other functions. In today's supply chain, the critical skill is coordination. Each decision impacts—and is impacted by—other aspects of the supply chain. Maintaining open and clear communications is very important, and this requires managers to have multi-lingual capabilities and multi-cultural awareness.

Technical competence. The dominant technology used to be localized and isolated optimization tools. Optimization-based decision support systems for individual functions rose to prominence during the late 1980s to the 1990s. Transportation and warehouse management, production planning, and other systems emerged during this time. These solutions tended to be narrowly focused within a function. Today, high-powered optimization engines are still used, but the more critical components focus on visibility and coordination aspects. Technologies that connect multiple organizations such as CPFR and collaborative exchanges support the flow of data across supply chains.

Collapse of the hierarchy. Previously, supply chains managers had local and controllable influence over all aspects of their function. This typically led to a hierarchical reporting structure where a direct style of management was most common. Most of the functional managers developed "hard" skills for leading people and organizations they controlled directly.

Today, the supply chain manager's reach exceeds his or her grasp. Leaders are required to influence behavior across the entire supply chain to include organizations

and people who do not report to them or are not even in the same organization. These leaders have become influencers rather that dictatorial, hierarchical managers; they are required to exert influence indirectly and achieve change through persuasion.

More yardsticks. In the functional world, performance measurement systems were defined by a bounded set of activities with a single focus. Today, these systems need to be multi-tiered and multi-faceted to capture the breadth and depth of company operations.

Risk factors. Risk management tended to be reactionary in the functional era. The strategy was typically to build robustness (through excess inventory or capacity) into the individual functions or areas, so they could weather disruptions to supply, demand, or production. Today, risk management has transformed into one of supply chain management's primary roles. The new emphasis is on developing planned responses for potential disruptions, and strategies for creating opportunities for flexibility within the supply chain.

Pushing the Skills Envelope

The net effect of these changes is that SCM has become a broader and deeper discipline. The breadth of the supply chain is now global, and managers are expected to work with a wider variety of people, cultures, and geographies. The increase in depth is a reflection of the more complex relationships between the functions and the sophistication of the different technologies and tools in use today.

In this environment supply chain managers are being pulled in two directions. They need to become generalists with good communication and coordination skills, and also specialists who can lead within their domain and, in some cases, offer deep technical expertise. In other words, these leaders have to be exceptionally well-rounded professionals both as team members and individual executives.

In a recent interview with MIT CTL, Christine Krathwohl, Executive Director, Global Logistics and Containers, General Motors, emphasized the importance of a broad background to her role as a logistics leader.

Krathwohl expressed it this way: "I tell every young person who wants a career in supply chain or logistics that I reached my current position largely due to the varied experience I gained throughout my career. My time in manufacturing has allowed me to understand the requirements and challenges of our internal customers, and has given me a level of credibility and respect within the organization. Also, my experience working on the supply side allows me to understand the challenges that suppliers face, and that helps me to build a higher level of trust with these companies."

The Skills that Advance Careers

As individuals climb the career ladder in supply chain management, what leadership skills are important?

These supply chain professionals, "move from tactical to strategic and become more integral to commercial, market-facing decisions," said Joshua Merrill, Global Supply Chain, Dow AgroSciences LLC. "A supply chain leader effectively translates supply chain activities into business value, and conversely, desired market advantage into supply chain strategy."

"The best supply chain leaders operate in a dichotomy of time horizons," Merrill added. "They think three or four moves ahead while keeping one foot firmly planted in the operational reality of today's implementation."

The need to have a broad business perspective is emphasized by Daniel Stanton, Supply Chain Performance Manager, Caterpillar Inc. "Supply chain leaders need to understand that businesses are really an interconnected network of people, processes, and technologies," Stanton says. "Small changes can have major impacts up and down the supply chain, and around the world. Learning how to build and leverage diverse teams can help you improve performance across this network, and mitigate risks that might have gone unnoticed."

Effective team management requires excellent people skills, which have never been more important, believes Christine Krathwohl, Executive Director Global Logistics and Containers, General Motors. Her view: "I believe that you need to be a stronger people leader than ever before. Today's leaders should know how to build global teams that strive for the success of the corporation as a whole while balancing regional needs. Being a subject matter expert is useful, but is not as important as being a people leader because you have experts who can provide that kind of specialist knowledge."

There are six areas of expertise that are particularly important for current and future SCM leaders.

- More emphasis on a blend of "soft" and "hard" or analytical skills.
- The ability to manage and cultivate deep analytical expertise within the organization.
- Being able to excel as leaders of virtual, multinational teams.
- To appreciate big-picture issues and communicate vertically and horizontally.

Today's leaders have to be exceptionally well-rounded professionals both as team members and individual executives.

- Skilled at integrating complex technology systems that span multiple functions and multiple organizations.
- The ability to engage in strategic thinking at both company and industry levels.

The accompanying sidebar relates what some leading supply chain practitioners consider to be the key skills needed to advance a career in SCM.

Developing the Leadership Pipeline

Knowing which skills are needed to perform as a supply chain leader is one challenge; another is figuring out how to develop and retain the individuals who fit this profile.

Books have been written about identifying and nurturing corporate leaders, and we do not have the space here to do justice to this subject. But here are some strategies that are important in the SCM domain.

Give them a career path to the top. This may seem obvious, but in many companies SCM is still regarded as a low-profile, tactical role that does not extend beyond the operational trenches. Truncating a professional's career prospects in this way is a sure way to stymie their ambitions and, if they are capable, to lose them.

A number of enlightened companies realized this some time ago and have taken action. Electronics manufacturer Intel, for example, has established a well-defined ladder for SCM that parallels the paths taken by the company's engineering staff. Mapping such a path to the top requires leaders from HR and SCM to work together to establish career milestones and incentives.

Establish job rotation programs. A well-planned system for giving individuals temporary assignments in other departments and/or geographies, gives prospective leaders the breadth of experience they need to fulfill their ambitions. Moreover, providing new challenges and fresh experiences helps to keep these individuals interested in the organization.

Within her industry, GM's Krathwohl noted, "If you can get a job rotation on a plant floor, my advice is to take it. It's the best experience you will have in terms of people dynamics and the operational environment." Encouraging individuals to venture outside their comfort zones is also important. "Even within the job or function, you have to look outside of the box; what special assignments can you take, and what cross-functional teams can you be on to gain more experience?" she advised.

Overseas assignments add both depth and breadth to a supply chain manager's skills set. "We transfer and rotate people in terms of countries," said the HR vice president of a global apparel manufacturer. These placements are carefully managed. For example, individuals are matched to the maturity of the overseas business. When the company was acquiring a business in Asia, "the type of people I need to do the start up in transition are not the type of people I need going forward," the HR executive explained.

Build bridges with HR. It is difficult to develop effective leadership programs when HR managers' knowledge of the supply chain function is incomplete or shallow. Some organizations have a HR manager dedicated to SCM; others actively encourage collaboration between respective functions. As a senior HR executive responsible for SCM talent said: "If I don't understand where in the world we are growing and where we need resources, I can't develop effective programs like assignment rotations."

Encourage people to graduate through the ranks. A major retailer has made it mandatory for staff to have worked in certain mid-level positions before they can be considered for senior roles. Prospective leaders must have experience in managing a distribution center, for example. The aim is to make sure that these individuals are well-rounded both in terms of their own skills set and their view of the company.

Discourage the strategic bias. This is related to the above point, but pertains to the tendency to become obsessive about working only at a strategic level. For example, some companies complain that graduate hires expect to be groomed immediately for strategic positions even though they have not learned the ropes in more tactical managerial posts.

A senior supply chain executive in a global apparel firm lamented that in his experience, too many talented individuals refuse to even consider a role unless the word "strategic" features somewhere in the job title. An ambition to become a strategic wizard is fine as long as the individual concerned is prepared to gain experience in other areas first.

Invest in ongoing education. It almost goes without saying that given the pace of change and the intensity of today's competitive environment, companies need to invest in ongoing training and education to keep leaders' skills up to date.

Be Prepared

It is impossible to know for certain which specific trends will shape supply chain leaders a decade from now. However, the chances are that new dimensions—both in terms of the profession's depth and breadth of influence—will be added to the role. Here are some examples that are already appearing on the radar screen.

- Much more emphasis on environmental and social awareness.
- The need for politically savvy individuals who can navigate a constantly changing world.
- An intimate knowledge of social media and related communications technologies and channels.

Rather than trying to predict which skills sets will be a top priority 10 years from now, a more effective approach is to be prepared to meet these demands by being flexible and agile today.

- The ability to interact with non-commercial organizations such as governments and NGOs.

Adding to the complexity is that SCM is evolving at different rates around the world. Emerging economies are still in catch-up mode compared to many western countries, but the gap is closing fast. And the SCM leadership challenges in these countries are unique in a number of ways.

As is the case in the SCM space generally, rather than trying to predict which skills sets will be a top priority 10 years from now, a more effective approach is to be prepared to meet these demands by being flexible and agile today.

Geographic Analytics: How HP Visualizes its Supply Chain

How can you make strategic supply chain decisions faster and more effectively? For HP, one answer lies in a technique called Geographic Analytics—the visualization of network information on a map in order to drive supply chain optimization. Flexible, transparent, and intuitive, GA has greatly enhanced HP's toolbox for strategic assessments.

By Jozo Acksteiner and Claudia Trautmann

When HP launched its biggest supply chain transformation in history in 2010, it was evident that the challenging multi-billion year-to-year savings targets would be difficult to reach in the traditional way. This transformation required new approaches to deliver substantial improvements across businesses, targeting cost reductions as well as structural streamlining in the form of partner, network and site consolidations. To meet these challenges, HP had to enhance its analysis toolbox to deliver supply chain projects faster and with better alignment across businesses and regions. (For more on the transformation initiative, see sidebar on "HP's Transformation Challenge.")

One of the successful approaches developed to enhance our supply chain analytics capabilities is what we called "Geographic Analytics" (GA), a visualization technique that we describe more fully below. GA works. It reduced the time required for network optimization projects by up to 50 percent. In addition, projects driven by this approach were often better supported by the business groups. The reason: Executives became involved much earlier than they would have in traditional, purely data-driven supply chain analysis work.

Although designed to support supply chain network optimization, Geographic Analytics has applications far beyond its original purpose. We received major interest in this technique from groups both inside and outside of HP, including from sales and after-sales organizations, enterprise risk management functions, and from supplier relationship managers. Each of these groups has a regular need

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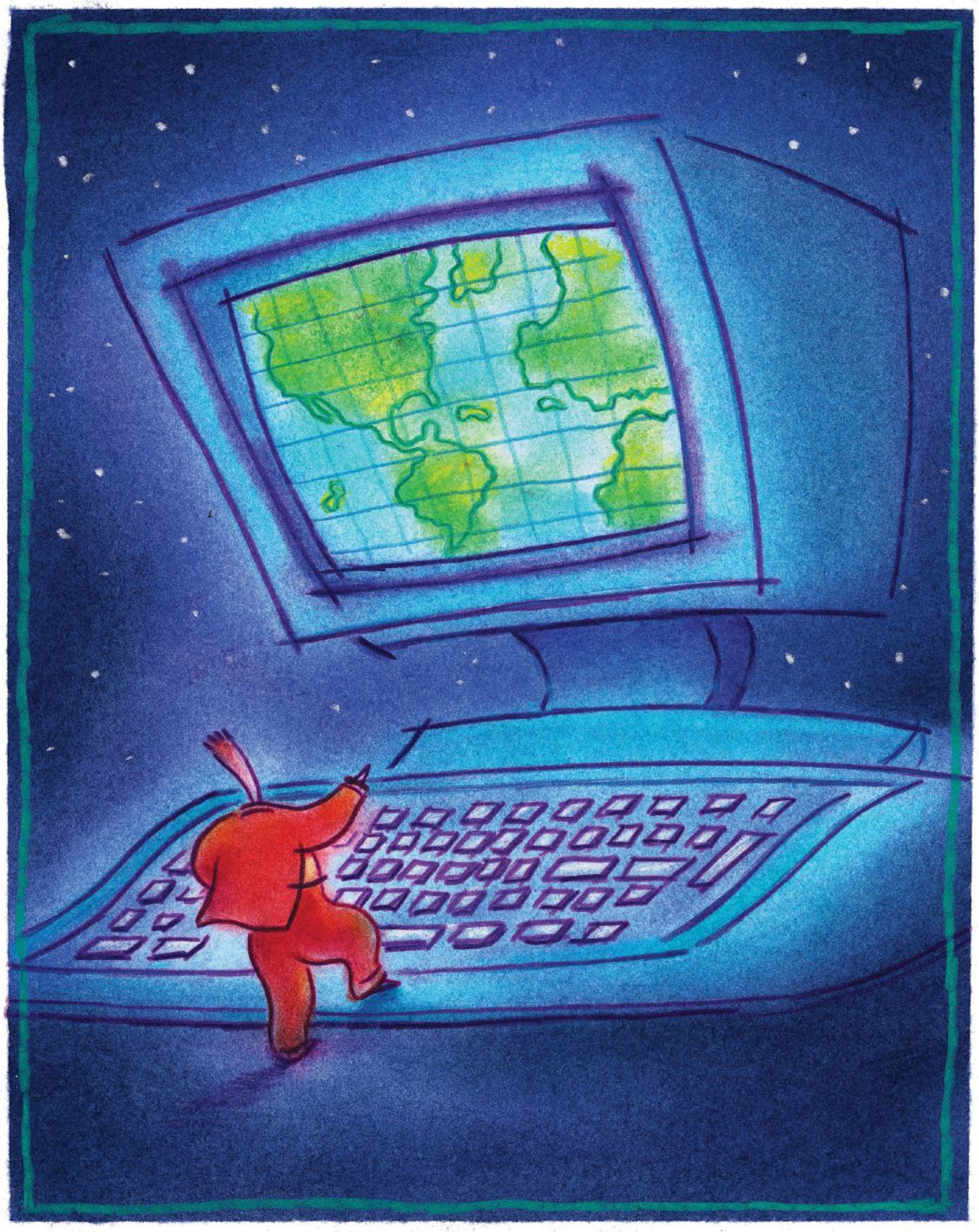


Craig Smallish

for visualizing and analyzing location data for a variety of purposes ranging from studying after-sales networks to risk management of the supplier base.

What Is Geographic Analytics?

Let us now take a closer look at what Geographic Analytics is. In simple terms, GA is the visualization of network information on a map in order to drive supply chain optimization.

To get started, you map the relevant locations of the network, such as the distribution centers that you want to consolidate. Next, you add basic background information such as hosting business group, square footage, and volume information applicable to each location. Lastly, you apply a smart directory structure that allows you to categorize the locations and quickly filter them to give selective views of the map as needed.

In any analysis project, the data collection, cleaning, and interpretation are very time-consuming. The key is to avoid analysis paralysis. Instead of feeding comprehensive data sets into complex analysis tools, GA first aims to visualize only the most basic information—with the goal to provide the shortest possible "time-to-insight" to all stakeholders involved in the project's decision-making process.

Many supply chain assessments have "intangible" framing conditions that are disruptive to any purely data-driven optimization solution. It is very important to capture such conditions as soon as possible. If they are overlooked or detected late, they can lead to significant rework and frustration for everyone involved. For example, there might be regulatory requirements or tax conditions that overrule the data-driven optimized solution. Furthermore, there are often infrastructure constraints not reflected in traditional optimization software packages, such as local traffic congestions that make certain areas of a city unfavorable for heavy-traffic warehousing.

Displaying basic information on a map to involved stakeholders and experts, such as analysts and subject matter specialists, helps to identify and capture such conditions upfront. This method uses their intuition to determine the project's course, as we describe below.

When the key information is visualized on a map, approaches to a supply chain problem evolve almost automatically:

- Densities of locations highlight major demand areas or inefficiencies in the structure—for example, too many locations in a small area.
- Additional data visualization techniques, such as simple traffic light indicators (for example, sites with high levels of inventory colored in red, sites with low inventory levels in green), guide both analysts and stakeholders to key areas of focus.
- Publicly available infrastructure information shows access to highways, airports, seaports, and railways.

Surprisingly little data is actually needed to determine the further course of the analysis. Often, hypotheses can be agreed on and unfavorable solution options can be dismissed before a more detailed analysis takes place.

The simplified approach is the starting point for the deep-dive into the remaining solution options. This usually requires a significantly smaller data set than what would have been needed without GA. An intended side effect is that at the end of the initial analysis, stakeholders and experts supporting the project will already

HP's Transformation Challenge

As the world's largest technology company, HP operates the most complex IT supply chain in the world—delivering notebooks, PCs, and printers as well as large servers and room-filling web-press printing systems, and their associated parts.

Building on a long tradition of supply chain innovation, HP in 2010 saw opportunities to further leverage its scale and launched a company-wide transformation program targeting substantial supply chain improvements in procurement, processes and IT, warranty and services, and network and logistics.

The authors were part of the program management teams accountable for delivering the challenging multi-billion year-to-year savings and structural improvements to HP's physical supply chain network. With a total timeline of merely two years, the program teams faced significant challenges, including:

- **Launching supply chain analysis projects to create excellent solutions fast.**
- **Delivering close-to-optimal results in imperfect data situations.**
- **Overcoming local optimization within the businesses towards a converged cross-HP supply chain that aligned solutions across business groups.**
- **Gaining full buy-in from operational managers in order to implement solutions quickly.**
- **Coping with a mature and complex supply chain grown both organically and through acquisition.**

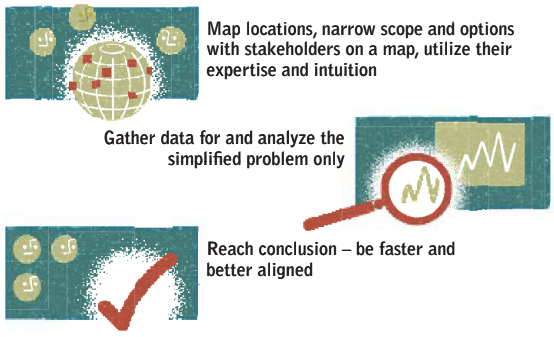
In order to effectively meet these challenges, HP developed new approaches that enhanced its existing analysis and optimization portfolio for supply chain improvement.

be reasonably well aligned. Instead of being confronted with a solution coming out of a "black box" at the end of an analysis, all sides are involved from the start in the decision-making process.

Overall, GA speeds up traditional data-driven approaches because much less data is required. The reason is that relatively few pieces of information—once displayed on a map—are sufficient to obtain most of the background information from the involved parties. We call this "harvesting the intuition behind the problem", a step that can significantly simplify data-driven analysis. This approach ensures that the analysis is steered in the right direction from the start as depicted in Exhibit 1.

EXHIBIT 1

Decision Making with Geographic Analytics



How GA Contributes to Business Decisions

We have assembled a collection of examples where Geographic Analytics can greatly benefit supply chain and business decision making. These examples relate to network optimization, network flow optimization, risk management, and after-sales service. For each, we describe the analytical focus and outline which parameters need to be defined to get substantial benefits.

Network Optimization

One of the supply chain manager's most important strategic tasks is to streamline the supply chain network. In many global organizations, cross-docks, warehouses, and distribution centers have sprung up like mushrooms over the years. The result is often a jumble that needs to be cleaned up to achieve a lean, top-notch supply chain.

The traditional approach to addressing this problem has been to conduct what is known as a "center of gravity analysis". For such an analysis, an expert—often an external consultant—is called in. This individual (or individuals) collects data, loads current sites, flows, inventories, transportation costs, and other data into a complex software tool that almost magically determines the optimal locations for your network.

The center-of-gravity-analysis approach has its drawbacks, however. The data-gathering and data-cleaning effort is time consuming and can be costly. Moreover, it is often difficult to put the recommendations produced by the software tool into action. And if you subsequently find that some of the implicit framing conditions do not apply to your situation, you are faced with the possibility of redoing the whole analysis.

This is where GA can expedite and streamline the process. Exhibit 2 shows a sample network of HP services and distribution sites in Singapore before we conducted a comprehensive consolidation analysis. Data was scarcely available; in fact, at the beginning of the project only the current locations and their space requirements were known. Yet even with this minimal data set, GA immediately highlighted a large part of the solution:

1. HP had four areas of presence: North, East, Central, and West. Stakeholders as well as experts agreed that the optimal solution would fall into one of these areas.

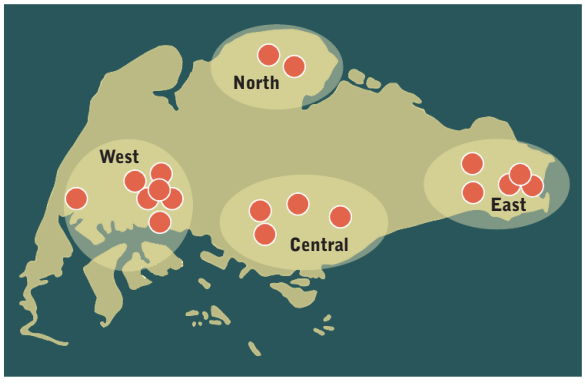
2. The main cost driver within Singapore was rental cost rather than labor or transportation costs. A closer look revealed that those costs were significantly higher in the East and Central areas than in the West and North.

3. For HP's major export and import activities, the West was favorable because of its proximity to the harbor.

From these three points, we could outline the overall strategy: Consolidate as much as possible in the West. Instead of undertaking a general and open ended site-consolidation-at-optimized location analysis, we broke the problem down into several small problems that were much easier to communicate, understand, and solve. Our approach was to analyze what prevented each site to be moved to the West.

EXHIBIT 2

Singapore Site Location Optimization



One could argue that this site consolidation example is a relatively simple one. However, the GA techniques used in this example apply similarly to much larger network optimization problems. If the GA approach does not solve the problem completely, it can effectively reduce the problem down to a handful of strategic questions that require significantly less data and effort than traditional approaches.

Network Flow Optimization

We can take the network optimization a step further by adding product flows between sites. From an analytical point of view, the network flow optimization problem is even more challenging than pure location consolidations. Transportation flows typically have physical constraints that prevent consolidation, namely the incompatibility of transport means—for example pallets vs. slip-sheets, less-than-truckload vs. full-truckload shipments, containers vs. trucks, and so on. Therefore, it makes even more sense to visualize transportation flows prior to a deep-dive analysis.

Exhibit 3, which is illustrative only, depicts transportation flow visualization, in this case for EMEA (Europe, Middle East, and Africa). The sample flows depicted show different products in different colors. The arrow thickness corresponds to yearly shipping volumes.

Analysis of the display of the flows quickly points to potential optimization areas:

EXHIBIT 3

Sample Network Flow Optimization in EMEA

- Major flows go from Eastern Europe into several Western European countries. If these flows move mainly via LTL, there might be an opportunity for freight consolidation in Eastern Europe. This could involve full truckload shipments to the West and subsequent cross-docking or advanced "milk-run" routing to the final destinations.
- There are flows for product A from Central into Eastern Europe, and for product B from Eastern to Central and Western Europe. This points to possible backhaul trucking opportunities for the two products, noting that backhaul rates are usually significantly cheaper than one-way rates.
- Truck volumes to the North and South display little consolidation opportunities, so they can be treated as a secondary priority.

Risk Management

Risk management and contingency planning have become major considerations for supply chain managers in today's ever leaner—and thus ever more vulnerable—networks. The Japan earthquake and Thailand flooding in 2011 served as reminders of these new focus areas. Some of the most pressing related questions are:

- For natural disasters, which areas in the network are most vulnerable? Or, if disaster has already struck, how is the business affected?
- Where should supply sites be positioned to mitigate risks from natural disasters for the company?

These questions can be addressed by mapping the supply sites of your network as conceptually shown in Exhibit 4. Suppliers are mapped together with an assessment of the risk they pose to the supply network. Red signifies a high risk of failure from this supplier, while green shows a low risk. The assessment could be based on your company's volumes with this particular supplier, or on the number of products affected should this supplier fail to perform.

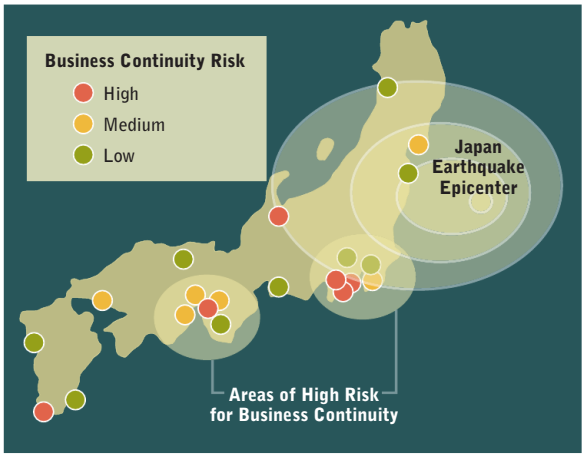
Through this mapping exercise, areas of high risk become apparent—prior to any more data-intensive analysis. In a subsequent step, in-depth risk analyses can focus on these areas.

After-sales Services

Service level agreements (SLA) concerning spare parts are a crucial point of any contractual agreement between service provider and customer. Customers will pay a premium for the service provider's commitment to deliver and exchange parts within a specified timeframe. Therefore, from a service provider's perspective, one of the supply chain manager's most important jobs is to match customer service level requirements with suppli-

EXHIBIT 4

Visualization of Supply Chain Risk Management



er capabilities. Over-commitments, such as a promised turnaround time that cannot be met, lead to customer churn and penalties. On the other hand, under-committing means that a higher service commitment at the same cost could have been provided to the customer.

Several questions are relevant here:

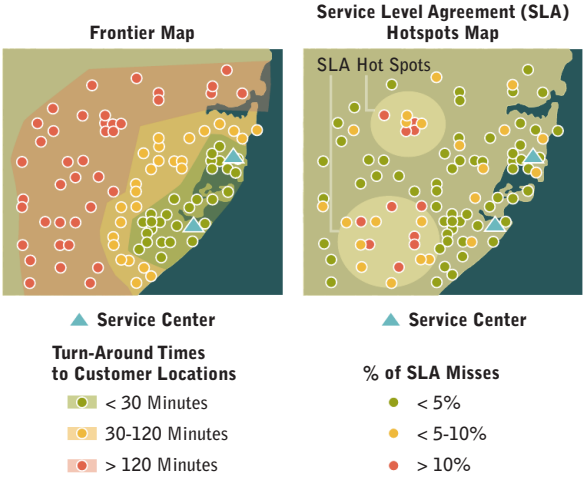
1. For a new customer, is the current network capable of fulfilling the service levels that this customer demands? And what is a realistic reaction time?

2. Are there "hot spots" in the existing network where SLAs are often missed? Should the network be upgraded?

Geographic Analytics can be of great help in answering these kinds of questions, as illustrated in Exhibit 5. The left picture displays a "Frontier map" with a traffic light system characterizing historical turnaround times. The mapping provides a good overview of the service levels that can be realistically offered in a certain area.

EXHIBIT 5

Service Level Commitments: Frontier Map and "Hotspots"



The right map, which we call a "SLA Hotspots Map", identifies areas where SLAs are frequently missed. For example, these could be a sign of infrastructure bottlenecks from chronically congested access roads. This type of mapping also helps to identify areas for additional service center locations.

A Five-step Approach to GA

In our work at HP, we have identified five steps to get a Geographic Analytics project up and running successfully:

1. Create a Site Database

The first step is to create a database with the locations you want to map. This will be the basis for all GA. Databases can be created on an ad hoc basis for the problem at hand, or more systematically as a permanent repository that can be used for multiple projects.

The real power of GA gets unleashed with a permanent site database because of these advantages:

- Ready-to-use data allows quick strategic assessments.
- Existing databases permit easy sharing with other interested groups, which is the key for widespread use.
- Permanent databases come at a comparatively low cost. The main work lies in setup of the database, whereas ongoing maintenance requires very little effort.

2. Decide How to Represent Sites

Data representation will determine to a large extent how intuitively the data can be used. In this phase, quality trumps quantity.

The icons denoting your locations play a vivid role; therefore, the time and effort spent to set them up smartly is well invested. Icon shapes, acronyms, colors and sizes should be intuitive. Strike a balance between simplifying and conveying sufficient information. Our recommendation is to limit the icon representation to two or three levels or dimensions to keep a narrow focus. A proven approach is to use icon shapes for denoting the site type (for example, to distinguish manufacturing and distribution sites), acronyms for the different business groups, and different colors to represent a "traffic light" system.

A good traffic light system is intuitive and it establishes the key measure of the assessment. Sites with high inventory, high failure rates, or high costs that require further attention would be identified in red; those with only moderate issues in yellow; and the best-performing

sites in green.

Organize your data with a filtering structure that lets you dynamically choose which groups of sites to display. This allows you to adapt the mapping addressing different areas of analysis one at a time. Typical examples are filters for business groups, location types, or the traffic light colors.

3. Select the Software

There are several tools, both commercial and free, that translate site databases onto geographic maps; an internet search for "mapping software" will lead to thousands of hits. In order to provide flexible support for HP's business groups, the authors developed an HP-own mapping solution. Whatever tool you use, make sure it is able to:

- Translate addresses into geo-coordinates if the latitude and longitude are not already included in your site database.
- Provide infrastructure and background information, such as city names, country borders, highways, railways, seaports, and airports.
- Customize the network representation through directory and filtering structures, different symbols and colors, and displays of additional relevant site information.

4. Align with the Stakeholders and Conduct an Initial Assessment as Early as Possible

As soon as you have the information mapped, show it to your involved stakeholders and experts supporting the project. Do not worry if the site data is not yet final. In our experience the first discussions will foster a common understanding of the current network and will channel the attention to the solution—independent of 100 percent data accuracy at that point. In addition, an early alignment helps to get the site data into a clean state.

Set clear and realistic targets for the first stakeholder meetings. First, confirm the network to be analyzed. Second, determine the direction of the analysis by questioning the current network setup, identifying hot spots, and defining potential solutions and hypotheses. Third, poll the stakeholders on their decision criteria for the overall solution.

From this foundation, derive those scenarios that will be evaluated in the subsequent analysis, while ruling out others because of their unfavorable physical, operational, regulatory, or other conditions. So, for example, a need for a seaport access would rule out inland locations, or import/export conditions or other trade restrictions would make certain countries unattractive.

One key benefit of GA: Executives become engaged in a project much earlier than they would have in traditional, purely data-driven supply chain analysis work.

5. Derive the Recommendation

GA will not always be sufficient to pinpoint the final solution, but it will significantly reduce the options to a few core scenarios that can then be analyzed with less effort. The optimization of HP's Brazil services and distribution network is a good example. GA did not give the complete solution, but it revealed the following simplified results that set the direction for it:

- Brazil was divided into five major regions.
- The actual network of eight locations was focused around the three fixed production sites in three subregions.
- For each of the production locations, an associated warehouse and distribution center was needed.
- Hence, the target was to consolidate to three main locations plus potentially some additional satellite cross-docks.
- Finally, the decision-driving factors for additional satellite cross-docks were established. The key factors were demand/volume in the satellite areas, transportation costs, and regional tax levels.

Additional data analyses ultimately led to the complete solution.

Key Lessons Learned

Our projects involving GA yielded some valuable lessons that we would like to share with other supply chain professionals.

Do not underestimate the lead time required to create a clean site database. Creating a site database requires considerable time. Aligning on the data fields is the easier part; verifying all sites, addresses and geo-coordinates is a far bigger challenge.

You will be surprised how much you did not know about your sites. For example, how many sites exactly are

in your network? This may sound like a strange question, but our experience—at HP and at other organizations—shows that sites can be overlooked. In one of our projects, a zoom-in on street level revealed the company logo on a building that was in question. With a geographic display of sites, disputes over the existence of a site can be settled in no time.

Typically it takes 6 months to 12 months from the start of data collection until the data is reasonably clean and complete. Maintenance to keep the site database up to date is very low. A quarterly update cycle usually suffices because most businesses change locations infrequently.

Be lean on data collection and display. The key to GA is speed and simplicity. It is a common mistake to request large amounts of data at the beginning of an analysis for fear of missing a crucial data point. In our experience, less is more when crafting a timely and usable recommendation. Always remember it takes time to collect and process each additional data point, and this keeps you from aligning the already available material.

Simplicity in the data display also is key. A simple traffic light system helps people grasp the state of a network at a glance and will focus further discussions. Intuitive icons provide additional insights. Conversely, fine-tuned graphics overloaded with complex symbols will distract rather than enlighten, making it more difficult to achieve quick success.

Leverage publicly available mapping information. Many geographic mapping tools allow the display of additional information ("overlays") that can provide valuable background information for decision making. Use them!

Commonly available overlays include:

- Road information such as expressways, access roads, and street names.
- Infrastructure hub information—for example, harbors, airports, and railway stations.
- Distance information such as linear and street distances.
- Environmental information on weather conditions, earthquake zones, hurricane routes, and so forth.

Start with a prototype. When people use GA, they love its simplicity, transparency, and power. When a project is viewed in retrospect, the advantages of GA generally become indisputable. However, it may prove difficult to get the first buy-in for the investment to set up the site database and the mapping tools. To overcome this hurdle, we recommend using a prototype to display what is achievable through GA. With such a prototype, it becomes much easier to secure support for a site-database and a mapping tool.

A Tactical and Strategic Asset

Flexibility, transparency, and speed make GA a great instrument to support strategic and tactical supply chain decision making. Geographically visualized data is easy to understand, thereby facilitating faster hypothesis derivation and decision making. It reduces the number of solution options by "harvesting the intuition behind the problem"—that is, by capturing the factual expertise of the parties involved, before heavy data-driven analytical tooling enters the scene.

Flexibility, transparency, and speed make GA a great instrument to support strategic and tactical supply chain decision making.

While GA is an excellent method to support geographic optimization, it is meant to complement—not to replace—traditional data-driven analytics. GA substantially narrows the scope and data requirements for supply chain problems while carving the path for further data examination. The project direction can be established quickly and dead-ends can be ruled out early.

Our experience at HP confirms that Geographic Analytics supports the collaboration and alignment between operational and strategic managers. In short, it is a valuable asset in modern supply chain management. ○○○

Maximizing ROI *from* Technology

By Francis J. Quinn and Judd Aschenbrand

Since supply chain technology emerged on the scene a few decades ago, practitioners have been interested in what's available, how it can improve their operations, and, more personally, how it will affect their job. And up until comparatively recently, the articles and industry events that addressed this technology focused on these aspects: What's hot, how can I use it, and how will the technology affect me.

Those questions remain as relevant as ever, of course. But now, more and more we're seeing another issue capturing mindshare, namely, What can we do to maximize the ROI from our technology investment?

In fact, in just about every technology-related webcast that *SCMR* has conducted over the past two years, the ROI question has been one of the very first asked by attendees. Maybe it's a sign of the economic times, which are still less-than-robust. Or it could be a more cautious approach to expenditures of any kind. In any case, all segments of the supply chain community—users, vendors, consultants, and academics—would likely agree that it's a positive development.

This article will offer some practical advice on how to build a solid business case for investing in supply chain technology and, once you've made the investment, how to make sure you're getting the most bang for your buck. We'll also introduce some interesting findings from a recent survey that *SCMR* conducted on what readers are doing to capture maximum ROI from technology—and where they could improve.

Making the Business Case

Before you can gain any return on supply chain technology, of course, you first need to make the investment. And in order to make the investment, you need a compelling business case that you can present to management. Boiled down to its essence, the business case has to answer the basic question: How will this technology investment make us a better, more profitable company?

SCMR columnist and long-time supply chain educator and software analyst Larry Lapide, says that the benefits proposition needs to center on three key areas: efficiency, asset utilization, and customer response. In a recent *Insights* column (*SCMR* November 2012), he broke down the benefit components this way:

- ***Efficiency:*** This benefit area is largely cost-reduction oriented and focuses on such elements as Cost-of Goods (COG) savings, operating cost reductions, and productivity improvements.

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The key question that supply chain professionals are asking these days is, What can we do to maximize the ROI from our technology investment? This article provides some practical answers from the experts. It also presents the results of a survey detailing how well practitioners are actually doing in getting the most from their investment.

Piotr Powietrzynski

• ***Asset Utilization:*** An often-overlooked source of advantage, asset utilization can include increased plant and warehouse usage and throughput, faster inventory turns, and deferred capital expenditures through better facility utilization.

• ***Customer Response:*** Technology can bring benefits in the critical "customer facing" activities through improved cycle times, Perfect Order fulfillment, and enhanced product or service quality.

Lapide advises that the business case focus intently on all these areas, not just the cost-inventory-reduction aspects, which is often the tendency. The case is strongest, he adds, when multiple potential benefits can be demonstrated from the new software functionality.

In his column, he offered this example: "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."

In making the business case, it's critical to do so in terms that the decision makers—i.e., executive management and financial leadership—will understand. Robert Rudzki, a former Fortune 500 SVP and CPO, now president of Greybeard Advisors LLC and a blogger on www.scmr.com, characterizes this as the language of the CFO. Basically, this will be expressed in revenue- or cost-related terms, Rudzki says, but it also could be expressed in terms related to working capital or asset utilization. All of

these elements can have a powerful impact on the overall key measure of ROIC (return on invested capital).

"Before you start on the business case, the best approach is to ask your own financial folks up front how they would like to see the return calculated," Rudzki advises. "This will be especially advantageous when you're measuring the effectiveness of your investment once the technology is implemented."

A preliminary step to setting those metrics and putting them in place is to understand your current processes and performance. The experts we interviewed for this article uniformly stated that without the baselines in place, any subsequent measures of ROI will be deficient—and maybe even meaningless.

"Taking an initial, introspective look at the company's current processes and resources before integrating technology into the global compliance mix is equally as important," says Beth Peterson, president of BPE Global and an expert in trade compliance software. "The biggest mistake [companies] make is they implement a solution without even beginning to measure what they were doing before they implemented it."

Setting Expectations

Identifying exactly what you want to achieve from technology investment better positions you for successful capture of the ROI. Is it improved customer service and response time from a TMS system? Or a reduction in operating costs from a new WMS? Or more accurate transactions from an automated procurement solution? In all cases, try to be as precise as possible—and be realistic in your goals.

A couple of caveats apply in the expectations-setting process. For one thing, make sure that the objectives do not benefit one functional area to the detriment of others or to the company as a whole. Jeff Karrenbauer, president of the consulting and software firm INSIGHT, sees this as a recurring problem in the implementations he has witnessed. "The objectives need to be comprehensive," he says. "Projected cost savings in transportation, for example, might result in higher costs in inventory or other areas. The silo mentality is still alive and well in many organizations, so this is something to watch for."

Rudzki of Greybeard Advisors argues that the objectives of any investment in technology need to be expressed within the broader context of strategic goals. "You first need to understand the strategic objectives of your business whether it's ROIC, EPS, or other metrics your executives are focused on, and also the role of supply management in supporting those objectives. You then develop goals for the technology investment that supports that role and those broader objectives," he says. "The technology is the enabler of those objectives and initiatives—it's not technology for technology's sake." (Exhibit 1 shows the elements involved in achieving the objective and realizing a true supply management "transformation", adapted from Rudzki's latest book *Next Level Supply Management Excellence*, the sequel to his best-selling *Strength to the Bottom Line*.)

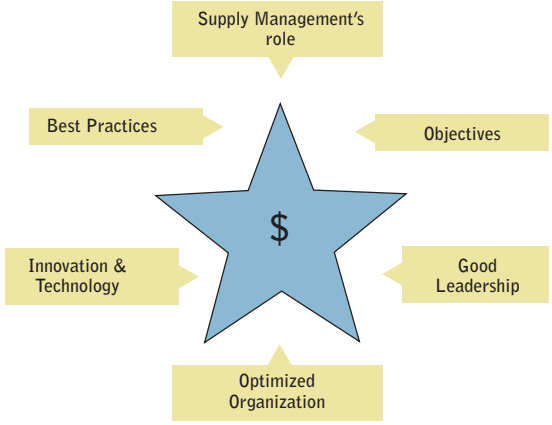
Vendor Evaluation and Selection

Once the investment gets the green lights (and in many cases even before the official go-ahead is given), the critical process of vendor evaluation and selection gets underway. An excellent summary of the key questions to ask in this process comes from Beth Peterson whose firm, BPE Global, helps companies with their global trade strategies. In an October 2012 webcast presented by *SCMR* and *Logistics Management,* Peterson advised shippers to use these seven questions as a guideline when evaluating prospective supply chain technology vendors. (In the webcast, Petersen was specifically addressing Global Trade Management software, but her points apply equal well to any supply chain technology.):

1. What is the vendor's planned capability?
2. What has the vendor developed in the previous two years?
3. Was the vendor on track with what was planned on their roadmap?
4. Has the vendor switched strategies based on their biggest accounts/highest revenue opportunities?
5. Does the vendor have a user group and/or advisory board?

EXHIBIT 1

Key Elements of Strategic Transformatopm



Source: Adapted from Next Level Supply Management Excellence, J. Ross Publishing, 2011. (Used with permission).

6. Is there an opportunity for you to benchmark with other companies who use the vendor's solution?

7. How closely does the vendor track product releases against their roadmap?

(Note: To hear Peterson's webcast presentation in full, go to www.scmr.com, click on the "Webcast" tab, and sign on to her presentation at the "Best Practices in Global Transportation & Logistics" Conference.)

Virtually everyone we spoke with underscored the importance of checking references before making any commitment, particularly if the vendor is new to the organization. Importantly, these reference checks should be fairly in-depth. Too often, this activity is just a quick phone call that does not go into any detail or provide any feedback that would aid in decision making, one consultant told us. A prospective buyer should come in with a well-researched set of questions for the reference to get as much useful information as possible. And, there should be more than one reference contacted.

Then there's the hard-to-define but important factor of "fit" with your company? Does the prospective vendor understand your business, your culture, and your priorities in getting the software up and running? Oftentimes, good insight into these questions can be gained from a test pilot using a slice of the vendor's software. Rudzki likens this to "playing in the sandbox." He explains: "The idea is to use the software in your environment for a week or so, applying it on your own terms and with your own people." This approach not only gives you sense of the software's capability and intuitiveness, but also of the vendor's willingness to cooperate with you going forward, he adds.

The Implementation Process

How effectively you proceed with the implementation process is central to a successful launch, consistent usage, and ultimately ROI capture. Key factors that need to be in place include the flowing: effective user training; management support of and commitment to the initiative; sufficient allocation of resources; and, perhaps most importantly, buy-in from the users.

Speaking to the that last point, Rudzki of Greybeard Advisors says that one of the biggest obstacles to buy-in relates to the users' understanding of the business reason for the technology. "If the users understand the bigger picture of how the technology will make the company more efficient and successful, they are more likely to become excited about it," he says. "But if they view it as 'just another task they're adding to our to-do list', they are more likely to resist."

Another success factor in ongoing implementation revolves around redundancy—that is, making sure that multiple users know how to use the various components of the system.. "One of the biggest problems we see with our clients is continuity in terms of employee turnover," says Jeff Karrenbauer of INSIGHT. The solution, he says, lies in an aggressive and comprehensive training program.

With some types of supply chain software, WMS and TMS solutions for example, it's advantageous to begin by implementing certain modules as opposed to the entire package. "Getting one element up and running successfully and delivering results can create good momentum and help ensure that the project is on track," Karrenbauer says.

Measurements in Place

The exact measures used will vary depending on the specific application employed, but they will typically center on cost savings, revenue generation, or other quantifiable operational improvements. So for an operations-oriented system like a WMS, TMS, or procurement automation system, the measures could focus on administrative expenses, greater throughput, inventory turns, or labor productivity. Costs for each of these areas can be measured against the baseline established as part of the ROI assessment.

Beyond the core measures that focus on cost reduction and lower inventory, other measures need to be considered as well. In particular, Larry Lapide points to the "customer facing" metrics that address customer satisfaction and that can lead to more business and greater market share—i.e, a revenue-generation metric. "Measurements like order cycle time and Perfect Order performance are critical," he says, "because this is what your customers actually see. They don't see your internal metrics." Another effective metric Lapide has observed is the amount of time that sales reps spend on order management "administrivia". By reducing this time, he notes, you not only reduce order cycle times from a customer perspective, but from a revenue-enhancing standpoint free up valuable selling time.

Technology also can greatly enhance asset utilization, adds Lapide, and thus should be measured as well. "In a number of cases, I've seen the adoption of new technology enable a company to take an existing asset and greatly improve its productivity," he says. "This can have a huge impact on the company's balance sheet, particularly if it means that an enhanced existing asset means that they will not have to build or acquire new assets." In this regard, production and changeover cycle times are operational metrics that when improved can increase

production capacities and possibly defer building a new plant or installing a new production line.

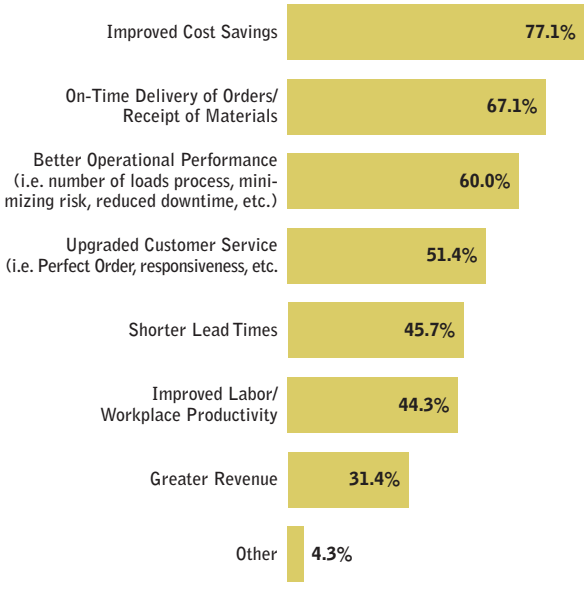
With the right measures in place and with accurate data available, it becomes far more feasible to measure the progress of a given technology investment toward delivering the expected return.

What the Survey Says

We've heard from a number of experts about maximizing ROI from your technology investment. Now let's take a look at what supply chain practitioners are doing—or are not doing—on this front. Peerless Research Group in late 2012 conducted a survey among readers of *SCMR* to determine the practices and procedures they had in place to maximize return on their supply chain technology. The results reveal that in many cases they are following the counsel of the experts we just cited, but in other important areas there was need for improvement.

EXHIBIT 2

What Benefits Are Measured in Your Analysis?



Most of the100-plus respondents to our survey do, in fact, conduct some sort of cost/benefit analysis on their technology implementations. The most commonly used measures, mentioned by over three fourths of the survey sample, was cost savings. This was followed by on-time delivery of orders and better operational performance. The last measure incorporated such activities as number of shipments processed, loads handled, and inventory accuracy. (Exhibit 2 shows the top seven benefits measured by the survey respondents.)

EXHIBIT 3

How Would You Assess Your Return on Technology Investments?

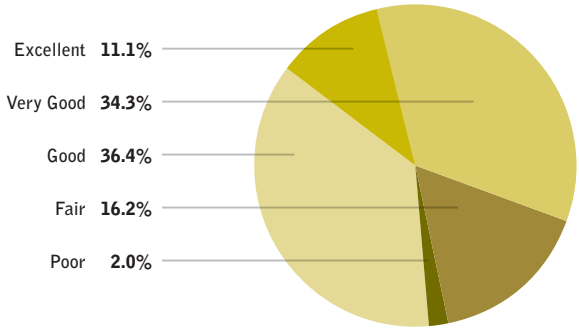
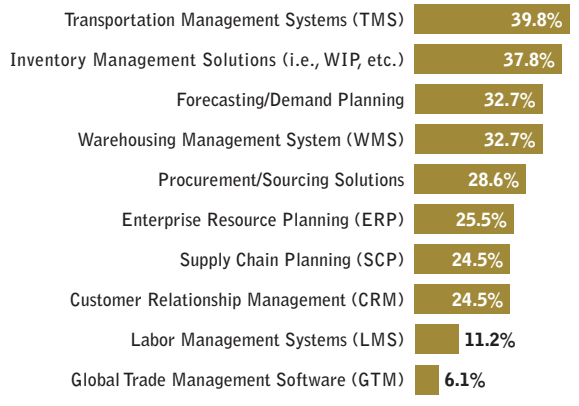


EXHIBIT 4

In Which Areas Are You Attaining Your Greatest Return on Technology Investment?



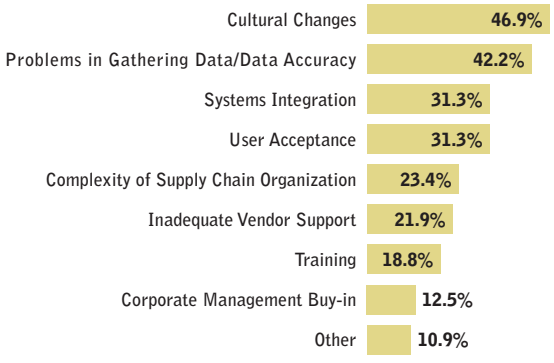
As for their general assessment of the benefits received for the cost of the technology, the supply chain managers expressed satisfaction overall—though room for improvement was certainly evident. Forty-five percent noted that their overall return was either excellent or very good. (See Exhibit 3.) On the other hand, over half gave the ROI a good or fair rating. Considering the level of expenditure for many of the technology investments, that number is probably not as high as it should be.

User acceptance and underlying supply chain processes were cited as key to maximizing return from the investments in software and solutions. Fully half of the respondents, in fact, mentioned these factors. Improved customer service resulting from the technology was another major success factor cited.

Asked about what specific types of technology

EXHIBIT 5

What Obstacles Did You Encounter in Implementing Strategies to Assess Your ROI?



yielded the top return, readers gave a mix of responses, reflecting the range of software typically in place in their organizations. Transportation Management Systems (TMS) received the highest number of mentions (40 percent) as the top-ROI technology, followed closely by inventory management systems at 38 percent. Exhibit 4 gives the rankings of the technology by ROI, as reported by the survey respondents.

By contrast, the technology application where ROI was most often reported as failing or disappointing was forecasting/demand planning systems. Twenty percent reported disappointment with these systems.

The survey respondents pointed to several obstacles that kept them from achieving the hoped-for return. (See Exhibit 5.) The biggest, not surprisingly, was the cultural change associated with implementing anything new—in this case, new software. In fact, close to half of all respondents cited the change component as a major obstacle to implementation success.

Problems around data gathering and data collection was another obstacle to maximizing ROI, cited by 42 percent of respondents. "Data timeliness and accuracy is the key factor to obtaining a successful ROI for your investment," one respondent commented.

The survey findings had some important implications for vendors as well. In particular, the users felt that the vendors could be a little more proactive in helping them gain the expected return. A number of respondents offered their views on how this could be done. Better training for users, a more timely response to issues the customer may be experiencing with the software, and greater post-implementation accessibility were among the recommendations offered.

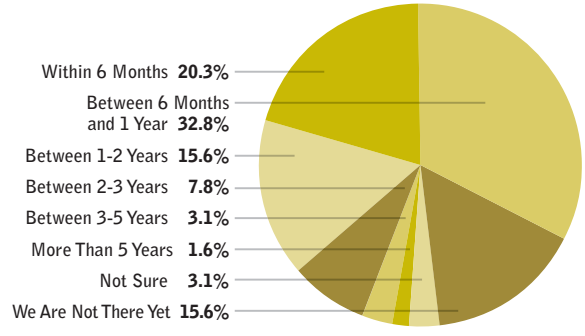
Several comments centered on the vendors' need to become more conversant with the user's business. The advice of one responding manager: "Hire business-knowledgeable, transaction-savvy talent—not system wonks!"

As to the timeline of the expected return on investment, the majority of respondents were looking for fairly quick results. Close to 80 percent expected an ROI within two years; of that, 17 percent were looking to capture the expected return within six months of implementation. "ROI is everything when discussing technology with prospective clients" one vendor told us. Or as one respondent put his implementation objective: "Quick install, short learning curve."

Interestingly, in most cases those high expectations were met. Twenty percent of respondents reported achieving ROI on their investment within six months and another 33 percent did so within a year. Exhibit 6 reports the overall satisfaction on timeliness of return.

EXHIBIT 6

When Did You Actually Start to Realize a Return on Your investment?



Asked what is the one key factor to obtaining a successful ROI for your investment in supply chain technology, one supply chain manager wrapped things up succinctly: "The effort needs to be led by supply chain, not IT; reviewed and endorsed by senior management; and the right skills applied with adequate time allotted to do the job."

When Supply Chains Save Lives

By Jan Komrska, Laura Rock Kopczak, and Jayashankar M. Swaminathan

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More than 20 million children worldwide suffer from severe acute malnutrition. The situation is especially critical in the Horn of Africa—the countries of Ethiopia, Somalia, and Kenya. UNICEF is effectively responding to that humanitarian challenge by providing specially formulated "therapeutic" foods to those in need. A more diversified supply base and more efficient supply chain are important parts of the story.

Abdi Tadole was one of the lucky children. Prolonged drought had laid siege to crops and livestock and all those who depended on them in Abdi's village in Northern Kenya. Abdi's grandmother, desperately worried about the starving two-year-old, carried him 10 kilometers to a dispensary. And there he was diagnosed and nursed back to health with vitamins, antibiotics, and high-protein therapeutic food.[1]

Amid continuing headlines about world hunger and food insecurity, there are, happily, more and more stories like Abdi's. A large part of the reason for that is the recent development of ready-to-use therapeutic food (RUTF)—a rich paste made of peanuts mixed with milk powder, oil, sugar, and fortified with vitamins and minerals. The sticky paste, distributed in little foil packets, is specially formulated to revive children with severe acute malnutrition (SAM). It has brought back many from the brink, restoring them to relative health in just a few weeks. Indeed, many observers have credited the food with lowering mortality rates during times of famine.

Individual packaging of the therapeutic food allows easy handling and prevents contamination of the product between feedings. Mothers can take RUTF home and give it to the child there, rather than having the child spend time in a feeding

center. In 2007, the use of this innovative "hit" product to address a major cause of elevated child mortality was endorsed by the United Nations, and demand took off.[2]

But the other part of the story is the responsiveness and effectiveness of the nutrition supply chain— specifically, the ability of the United Nations Children's Fund (UNICEF) to quickly bring and distribute RUTF to where it is most needed. Given the lumpy, "spiky" growing demand for the product, it requires an extraordinarily responsive supply base and supply chain to effectively meet that need. The task is especially tough because UNICEF has set a goal to include sourcing from countries where the product is used—countries in which local manufacturers face unique challenges.

The first long-term supply arrangement (LTA) for RUTF was established in 2001 with a sole qualified supplier, Nutriset, which manufactured the product at its site in France. By 2004, demand began to rise as more countries started piloting the use of RUTF, and it became increasingly urgent for UNICEF to identify new sources. During 2006 and 2007, the organization's Supply Division began to work with in-country manufacturers that could produce the product for local use, approving local suppliers in Niger and Ethiopia. However, it was quickly revealed that the capacity and performance of

these suppliers was very low and both countries would have to continue to rely mostly on imported product.

The situation at the global level became critical in mid-2008, when a hunger emergency affecting 8.4 million people was declared in the Horn of Africa, which includes Ethiopia, Kenya, and Somalia. Even after approval of a second global supplier (Vitaset, located in Dominican Republic), the 11,000 metric tons[3]—a total of 72,000 cartons—ordered by UNICEF, still largely from Nutriset, did not meet the peak demand. As a result, deliveries to country programs outside the Horn had to be postponed by three months, on average. Meanwhile, only 27 percent of orders for the Horn of Africa arrived on time, while the remaining 73 percent arrived with an average delay of 37 days. Furthermore, during the summer of 2008, UNICEF had to ship two-thirds of ordered product to the Horn of Africa by air, spending $8.2 million to do so. (Air shipment cost $36.92 per carton vs. $4.58 per carton for sea shipment.)

The lumpy, "spiky" growing demand for the product requires an extraordinarily responsive supply base and supply chain to effectively meet that need.

As a result of this experience, the Supply Division made three key decisions:

1. Carry out a study on RUTF supply chain performance in order to identify weaknesses and propose solutions.

2. Open the market for new RUTF suppliers by conducting an open bidding exercise.

3. Begin conducting annual forecasting for RUTF with individual country programs.

In 2011, an even more severe drought hit the Horn of Africa. This time, UNICEF was met with even higher expectations—the more so because RUTF was now familiar and so the feeling was that supply chains for the product would now be running smoothly. Those sentiments were on target: With the supply chain improvements that UNICEF had made, the organization was able to meet demand in that corner of Africa while maintaining uninterrupted supply to other parts of the world.

This article tells the story of how UNICEF Supply Division worked from 2008 to 2011 to ensure a diverse, sustainable, and responsive supply base, growing from a single European supplier to a network (in 2011) of 19 suppliers located around the world. The agency accomplished this in the midst of continued rapid demand growth and while improving supply chain responsiveness and effectiveness. The article also previews the next set of challenges faced by UNICEF.

If there is one thing that can be predicted, it is that natural disasters will strike again and again. UNICEF's experience provides valuable insights into how to create responsive supply chains for innovative hit products that leverage local supply in places such as Ethiopia, Niger, and Haiti.[4]

The Supply Chain for RUTF

UNICEF Supply Division, the agency's centralized procurement unit, delivers commodities to more than 130 countries worldwide. The three largest commodity groups include vaccines (2011 procurement spend of $1.03 billion), pharmaceuticals ($192 million), and nutrition products including ready-to-use therapeutic food ($166 million).

UNICEF is the world's major purchaser of RUTF.[5] Although RUTF is delivered to 57 countries worldwide, demand is concentrated in just a few countries: Ethiopia, Somalia, Kenya, Niger, and Pakistan, followed by Nigeria, the Democratic Republic of Congo, Yemen, Sudan, and Chad. A country's annual purchase volume varies dramatically as emergencies come and go. The level of total worldwide funding available varies with the economic climate and donor priorities.

The RUTF supply chain, like the supply chains for many products used by relief agencies, is not a typical product supply chain driven by customer desire to own and ability to pay for the product. On the contrary, the need for product in developing countries is generally identified by non-governmental organizations (NGOs) or by UN agencies such as UNICEF.

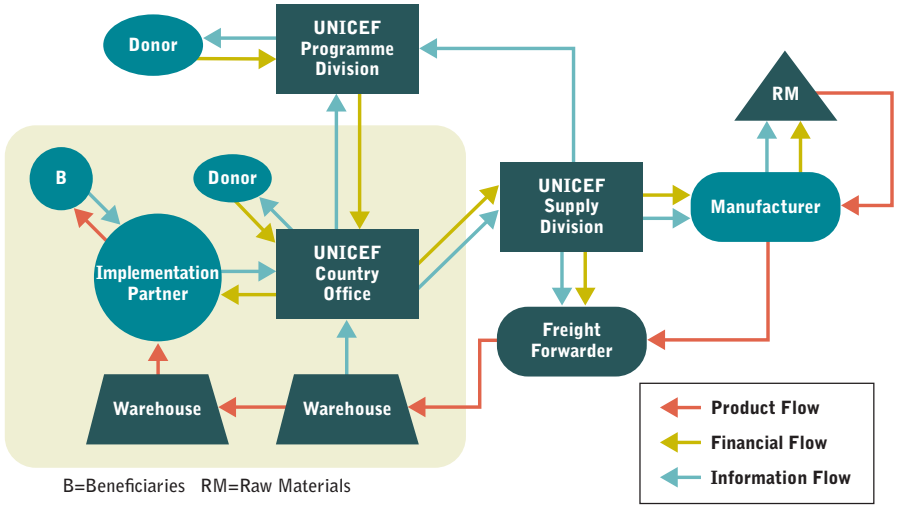
The "customers" in this case are children aged six months to 59 months. The children's caretakers are usually unaware of the product's existence and they lack financial resources to purchase it. These beneficiaries receive product for free through the existing health care system (health posts) or a parallel system (feeding centers) set up by NGOs in areas where the national health care system is non-existent or non-functional. The caretakers can then take the product with them and feed the children at home.

The RUTF supply chain is similar to the supply chain for essential medicines that are typically purchased and distributed to beneficiaries by national governments for free or for a small fee under pre-defined

agreed conditions. But as RUTF is a relatively new product, it is not yet integrated into existing national health care systems and its specific features (weight, volume, resale value) suggest that existing national distribution systems are not yet ready to embrace it. High product cost is also an obstacle for its inclusion in the national health budget. Therefore, UNICEF remains the major provider of RUTF and must mobilize financial resources from various donors prior to product procurement and shipment. Virtually all food of this type is procured using donor-specific funding for which project proposals must be submitted by UNICEF country offices. Delays in availability of funds are a frequent contributor to delivery delays and product stock-outs.

EXHIBIT 1

UNICEF's Supply Chain for Therapeutic Foods



The flow of information, funds, and RUTF product is relatively straightforward. (See Exhibit 1.) Supply Division places firm orders with suppliers, based on requisitions from UNICEF country offices. Suppliers manufacture the product and deliver it to an agreed seaport or airport. After the product has been cleared, it is delivered to the implementing partners (government or NGOs) who make sure it reaches beneficiaries.

Challenges in the Horn of Africa

Recently, the Horn of Africa has been the dominant destination for RUTF, accounting for almost half of UNICEF's shipments in 2008 and in 2011. In 2008, as noted earlier, poor performance of the UNICEF-managed RUTF supply chain in the region led Supply Division to commission a team from the University of North Carolina (UNC) and Duke University to conduct a study to identify RUTF supply chain weaknesses and propose solutions.

The study identified the following major sources of uncertainty that made it extremely difficult to match demand and supply for beneficiaries in the Horn of Africa.[6]

- Lack of information-sharing among the various supply chain entities—donors, Supply Division, UNICEF country office, Ministry of Health, and implementing partners.
- Lack of data about forecasts and consumption that could inform proper production capacity and logistics planning.
- Very long order-to-delivery lead times caused by a combination of long lead times for purchase order authorization and placement, production, and shipping.
- Uncertainty about the availability of funding and timeliness of funding releases.

The final report made five recommendations:

1. Implement key performance indicators to monitor and manage the supply chain.

2. Pre-position buffer stock to cut lead times and improve delivery of RUTF. Positioning stock in-country or in/near-region would reduce lead times. However, issues such as the product's limited shelf life, lack of working capital, and in some locations physical security concerns limited the amount of stock that could be held. For the Horn, adding buffer stock in either Dubai or Mombasa was considered.

3. Diversify the RUTF supplier base to better serve global needs. Diversifying the supply base would increase competition and enhance responsiveness. Fostering supply from suppliers located in countries of use would stimulate growth in local agriculture and food production and avoid cumbersome customs clearance processes. Local manufacturers, however, faced multiple challenges, including poor infrastructure, cost and timeliness of imported inputs, maintaining product quality, availability of working capital and foreign exchange, and timeliness of product delivery.

4. Improve inter-agency and donor collaboration

to improve response to nutrition emergencies. For example, uncertainty could be reduced by collaborating with donors to improve matching timing of funding releases with procurement needs.

5. Improve information flow and forecasting. Providing suppliers with better demand forecast information would allow them to plan for raw material purchases and better manage their production capacity.

How UNICEF Addressed the Challenges

In response, the UN agency made the following moves to improve the supply chain between 2008 and 2011:

Global Demand Forecasting

To address growing demand for the ready-to-use therapeutic food, UNICEF developed an Excel-based forecasting tool to calculate the quantities and value of products needed to treat the estimated number of children with severe malnutrition for each country of use, based on the UNICEF country offices' estimates of monthly admissions of children into feeding programs.[7] UNICEF first undertook global demand forecasting for RUTF in January 2009. The aggregate forecast of global product needs informed the bidding process and allowed Supply Division to tell individual suppliers how much product would be purchased by those countries whose demand had been allocated to them.

Accuracy of the aggregate forecast improved significantly: from 53 percent in 2009, to 81 percent in 2010, and 99 percent in 2011. However, forecast accuracy for individual countries varied significantly. Therefore, a mid-year forecast review was introduced. All countries ordering less than 50 percent of forecasted quantities by mid-year are contacted with a request for explanation and possible adjustment of their forecast.

Expanding the Supply Base

UNICEF used a competitive bidding process to increase the number and diversity of suppliers. The aim was to increase competition and responsiveness and achieve the right balance of "global" and "local" suppliers. UNICEF conducts limited competitive bids, soliciting offers only from qualified suppliers. The first competitive bidding process was preceded by an advocacy campaign among food manufacturers. The campaign was geared to starting RUTF production and included an invitation to suppliers to express their interest in producing the therapeutic food for the UN agency.

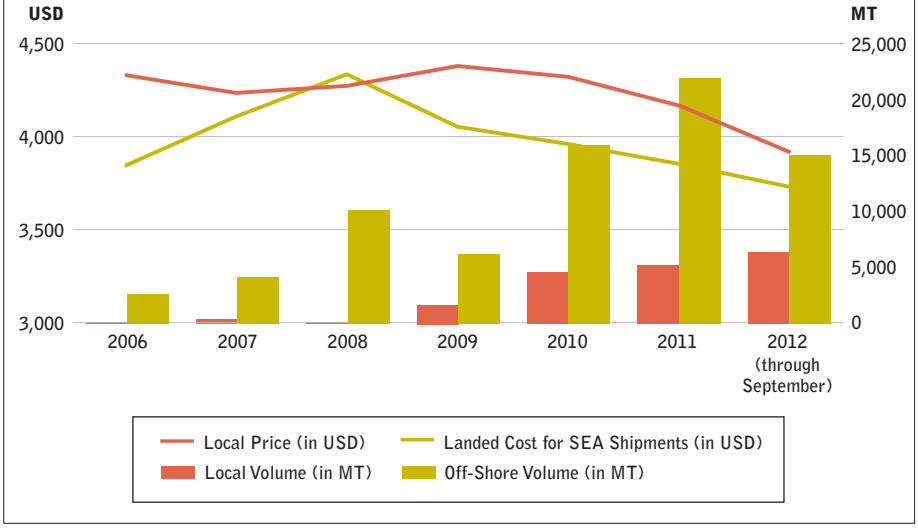
For many products, UNICEF establishes a two-to-three year long-term agreement (LTA) with the supplier that makes the lowest acceptable offer. The agency eventually develops a back-up LTA with the supplier that makes the second lowest acceptable offer. However, this approach would not have encouraged further RUTF market development and would have left UNICEF with one or two suppliers. Therefore, UNICEF established LTAs with all companies that met its technical requirements and allowed for additional suppliers later as they demonstrated that they could meet the requirements.

Today there are 11 qualified suppliers located in countries where the product is used (Democratic Republic of the Congo, Ethiopia, Haiti, Kenya, Madagascar, Malawi, Mozambique, Niger, Sudan, Tanzania, and Zimbabwe). While much of the demand is concentrated in Africa, nutritional emergencies may occur anywhere. For example, recent large-scale emergencies that required RUTF included the floods in Pakistan and the earthquake in Haiti.

The agency follows a variation of the "dual supply" sourcing strategy. UNICEF uses local suppliers to meet a portion of demand in their own countries, producing at a steady rate. It also uses global suppliers, which

EXHIBIT 2

Variations in Price of RUTF Produced Locally and Sourced Globally



are more responsive, to flexibly meet the remainder of any demand needed in those countries, to respond to demand in other UNICEF program countries, and to handle sudden spikes in demand caused by immediate responses to emergencies. Global suppliers have better access to working capital, and have demonstrated that they can very quickly adjust quantities of inputs and levels of production. (There are 10 suppliers outside the countries of use located in Dominican Republic, France, Norway, India and South Africa.)

Depending on the country and on the supplier, using a local supplier can be very challenging. With local suppliers, UNICEF typically sets an order level and orders regularly, so the supplier can run at a steady rate and fill its capacity. Even with the steady purchase volume, a given local supplier may not deliver reliably, as lead times for getting cash, foreign exchange and importing raw materials such as powdered milk and the vitamin and mineral mix may be too long. On the other hand, the local sources of ingredients like peanuts, sugar and oil are often of poor quality and unreliable. Overall, across all local suppliers, cost has been higher than that for global suppliers, in part because of import duties on raw materials of as much as 30 percent to 40 percent and in part because these manufacturers are in a start-up mode, with relatively low volumes.

In addition, delivery timeliness has not been as good. In 2011, among the 11 global suppliers, it ranged from 20.0 percent to 92.9 percent of orders delivered on time. Two suppliers located in Kenya and Madagascar have transitioned from being local suppliers to becoming global suppliers; they will now need to work to improve their delivery performance.

In addition to responsiveness, global suppliers are kept in the line-up for economic reasons. There are significant variations between the weighted average landed price of RUTF per MT shipped by sea from global suppliers to beneficiary countries and the weighted average price of locally purchased RUTF. (See Exhibit 2.) While in 2008, locally purchased RUTF was cheaper compared to imported product due to exceptionally high fuel prices and a strong euro-dollar exchange rate, the locally purchased RUTF has generally been more expensive.[8] However with increasing purchase volumes the local price is decreasing slowly.

Donor Collaboration and Pre-Positioning of Buffer Stocks

UNICEF initiated work in two other areas: donor collaboration and pre-positioning of buffer stock. The funding schedule for the country offices showed marked variability due to coordination issues between donor agencies and UNICEF. While donor agencies had their own reasons to hold back funding for RUTF, such delays made it extremely difficult to manage the on-the-ground flow of product, resulting in poor product availability. UNICEF has worked with the University of North Carolina research team to develop optimal operating policies under funding uncertainty and to quantify the impact of funding schedules on performance. Such analysis provides important insights as UNICEF evaluates the potential costs and benefits of innovative solutions such as bridge funding mechanisms that enable better collaboration between funding agencies and country offices.

Pre-positioning of buffer stocks for the Horn of Africa has not yet been implemented because the agency has been unwilling to allocate substantial chunks of money as upfront investments for inventory buffers. However, UNICEF Supply Division has been able to collaborate with the UNICEF regional office to solicit funds from the European Commission Humanitarian Aid Department (ECHO) for the investment required to implement a buffer stock strategy in West Africa—specifically, in facilities in Ghana for Burkina Faso and in Cameroon for Chad, Central African Republic, and Cameroon.

With its supply chain improvements, UNICEF was able to meet demand in that corner of Africa while maintaining uninterrupted supply to other parts of the world.

Positive Results to Date

Droughts have occurred regularly in the Horn of Africa over the last several decades, resulting in substantial loss of crops and livestock. Exacerbated by rising prices of basic foodstuffs and restrictions on trade movement caused by conflict, droughts have directly contributed to many more children suffering from acute malnutrition. In 2008 and again in 2011, the situation deteriorated so dramatically that humanitarian crises were declared. UNICEF country offices in Somalia, Ethiopia, and Kenya responded to the crises with a range of interventions that

focused on the most vulnerable. Delivering RUTF to malnourished children was a cornerstone of these interventions.

From 2008 to 2011, Supply Division identified and implemented several measures focusing on sourcing strategy as well as supply chain and supplier performance that contributed to the success. Dramatic improvements have been made. (See Exhibit 3.) Demand in the Horn grew rapidly from 2008 to 2011 as RUTF delivery volume more than doubled. Use of local supply increased significantly. Better planning and funding availability allowed for longer allocated times for deliveries. At the same time, the use of air for delivery from Nutriset decreased dramatically—from 71 percent in 2008 to 13 percent in 2011. The decrease in air shipments resulted from better forecasts of country programming needs, faster funds mobilization by the donors, and increased production capacity of the local supplier. However, delivery timeliness was far from perfect: 29 percent of orders in 2011 still arrived late, with an average delay of 28 days.

EXHIBIT 3

Performance Improvements Between 2008 and 2011

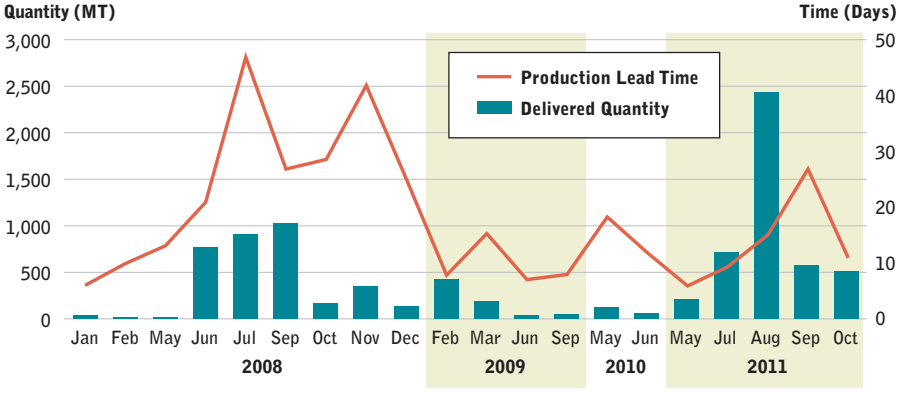
		2008	2011	Improvement
Quantity	Ordered Quantity	4,500 MT	9,500 MT	+ 5,000 MT
Sourcing	Share Sourced from Local Suppliers	4%	21%	+ 17%
	Share Sourced from Nutriset	96%	78%	-18%
Lead Times	Country Office Requested Lead Time	46 days	62 days	+16 days
	Supplier Lead Time (Nutriset)	33 days	20 days	-13 days
	Shipping Time Le Havre-Mombasa	37 days	36 days	-1 day
	Shipping Time Le Havre-Addis Ababa	42 days	42 days	0 days
Delivery Performance	On-Time Delivery to Port of Entry	27%	61%	+34%
	Average Delay	37 days	28 days	-9 days
	On-Time Delivery by Supplier (Nutriset)	N/A	78%	
	Average Delay by Supplier (Nutriset)	N/A	16 days	
Cost	Percent of Product Shipped by Air	71%	13%	-58%
	Product Cost per MT	$3,828.26	$3,677.54	-$150.72
	Freight Cost per MT	$1,924.23	$545.04	-$1,379.19
	Landed Cost per MT	$5,752.49	$4,222.57	-$1,529.92

Even though 11 global RUTF suppliers had been approved by 2011, Nutriset remained the region's major supplier because of various restrictions in the Horn, supplying 78 percent of delivered volume (for example, rebels threatened to ban UNICEF from Somalia should products manufactured in Kenya or the United States be distributed). While in 2008 Nutriset had to cover nearly all of worldwide UNICEF demand for RUTF, in 2011 nearly half was covered by other suppliers. This enabled Nutriset to focus on expediting deliveries to the Horn. Hilina in Ethiopia remained the only qualified local source of RUTF while other local sources were qualified in countries outside the Horn of Africa.

When demand for RUTF peaked in June and July 2008, the average production lead time at Nutriset increased to 45 days and remained high for six months. (See Exhibit 4.) (Production lead time is the time between the date the order is placed with the manufacturer and the date the goods are ready for pick up by the freight forwarder for onward shipping by air or sea.) In contrast, when nearly 2,500 MT of product was ordered in August 2011, Nutriset delivered this quantity within 15 days. While production lead time increased to 25 days in September, it returned to normal levels the following month.

EXHIBIT 4

Production Lead Times and Quantities Delivered to Horn of Africa



The Challenges Ahead

UNICEF Supply Division has successfully boosted the availability of ready-to-use therapeutic food and assured a responsive, sustainable and diverse supply base. At the same time, the agency has crafted a strong methodology for RUTF supply chain improvement and performance measurement. As a consequence, UNICEF has been able to cut landed cost of the therapeutic food by 27 percent, saving $14.2 million during the 2011 response to the famine crisis in the Horn of Africa. UNICEF's experience provides valuable insights into how to create responsive supply chains for innovative hit products that face lumpy, spiky demand and leverage local supply in places such as Ethiopia, Niger and Haiti.

Looking ahead, Supply Division will continue to work with UNICEF Programme Division and external partners to address evolving issues that could affect RUTF availability and accessibility for beneficiaries. Five areas appear to be most salient:

1. Resolve concerns about the flow of funds by creating working capital and/or buffer stocks. Uncertainty related to the amount and timing of funding schedules could be mitigated by adding appropriate buffers of cash or stock of RUTF.

2. Anticipate future production capacity needs as the market evolves further. Given expected demand growth and uncertainty about where demand will arise, demand forecasting and supply planning will be critical for establishing appropriate local and global production capacity.

3. Grow and manage the supply base as a network to balance availability, cost and development objectives. Continue to work to define how each global and local supplier contributes to timeliness, cost effectiveness, and flexibility of local and worldwide supply, as well as to support of local development objectives.

4. Extend measurement of global and local supplier performance. UNICEF Supply Division is working to further refine its criteria for measuring supplier performance, for what constitutes good supplier performance, and for better assessing local suppliers' delivery performance.

5. *Establish efficient local supply chains.* Building sustainable in-country RUTF supply chains managed by national authorities will allow integration of the product into national health care systems.

UNICEF Supply Division has successfully boosted the availability of ready-to-use therapeutic food and assured a responsive, sustainable, and diverse supply base.

End Notes:

1 "Child Alert, Horn of Africa: A report on the impact of drought on children," UNICEF 2006 and http://www.nytimes.com/2010/09/05/magazine/05Plumpy-t.html?pagewanted=all

2 UN Joint Statement issued jointly by WHO, WFP, UNSCN and UNICEF.

3 1 MT contains 72 cartons of RUTF and can save the lives of 72 children.

4 For a general discussion of supply chains for innovative products, see "What is the Right Supply Chain for your Product?" by Marshall Fisher, *Harvard Business Review* (March-April, 1997).

5 Other major purchasers include MSF, the Clinton Foundation, UNHCR and various other NGOs

6 For more detail, see W. Gilland, C. Mourchero-Vickery, A. So and J. M. Swaminathan "A Supply Chain Analysis of Ready-to-Use Therapeutic Foods for the Horn of Africa: The Nutrition Articulation Project" (November 2009).

7 In addition to RUTF, UNICEF Supply Division also ensures that all other products (anthropometric equipment, therapeutic milk and various pharmaceuticals) are available at each feeding center.

8 The UNICEF contract for supply of RUTF with Nutriset is in euros.

Interoperability: Capturing the Potential of Collaboration

By Patrick Van den Bossche

No part of any business has been immune to the challenges triggered by recent global developments. Whether it's the Euro crisis, the Japan tsunami, the Arab Spring, Hurricane Sandy, or any other dramatic event of late, companies' ability to respond to unexpected supply chain disruptions and sudden shifts in demand and supply has repeatedly been put to the test. And if you listen to observers and experts on weather patterns, demographics, social dynamics, etc., these types of "wild card" events are likely to occur even more frequently in the future. But every crisis can also present an opportunity: Being better prepared and/or recovering faster by more quickly and efficiently deploying scarce resources against these challenges than your competition, can give you an edge. That relies on an efficient flow of information across the organization and better cooperation between the different functions and departments. Unfortunately, that's easier said than done.

Most companies realize that they need to cooperate better across their organizational boundaries—not just to address wild cards, but also to unlock significant value that's trapped between silos. For example, companies that are the result of a merger or an acquisition will often see their intended synergies either delayed or not achieved at all because their operations were never truly integrated. For others, their current business unit-centric model is proving to be too resource-heavy: significant value and capital is locked up between business units because these companies are unable to break through functional and organizational boundaries.

As it turns out, these missed collaboration opportunities especially hurt a company's operations function. In a recent survey where we asked executives about the "top challenges in further improving operations performance," seven out of the top 10 reasons cited were related to failing collaboration across organizational silos. Examples that were called out included: the limited success that most companies have had with rolling out "best practices;" a tendency to suboptimize within business units or functions only vs. looking at things from a corporation-wide perspective; and challenges in integrating center-led efforts with decentralized operations.

So what's keeping everyone from working together better? First of all, not everyone speaks the same language: due to legacy issues, key metrics, business processes and technical terms are often different across business units, even if the technologies are quite similar. There's also frequently a lack of common understanding that prevents meaningful communication around cross-functional problems. And then there are the goals and incentives that each organizational unit marches against. These are often misaligned and they change over time. Additionally, companies that have gone through a large-scale IT implementation, often will notice that they have, maybe unintentionally, replaced person-to-person communications with automated data flows which rarely improves collaboration.

NATO as a Model

Interestingly, the solution to such a lack of cooperation (or at least a big part of it) was developed because of a crisis situation, namely World War II. NATO was established by the U.S. and Western Europe after that war. This new organization was presented with the challenge to make different participating nations' forces, units and systems operate together as one military unit. To accomplish this, NATO developed interoperability, defined as "the ability to operate in synergy in the execution of assigned tasks." NATO had to tackle problems at the strategic, operational, tac-

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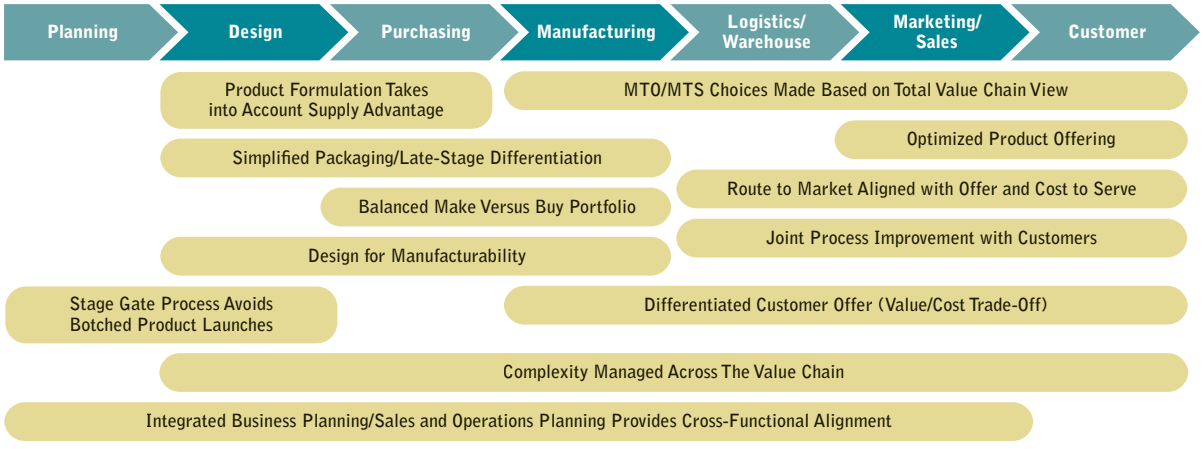
EXHIBIT 1

Examples of Results of Better Cross-Functional Interactions



Source: A.T. Kearney

tical, and technological level, while overcoming language and cultural differences. They found that the starting point needed to be a "unity of purpose, unity of effort and unity of command." In other words, it needed to be clear to everyone what they were there to do, how they were going to do it, and who would be in charge.

NATO commanders also quickly realized that this effort implied a depth of common education and training to produce quality personnel, with a common understanding of processes and procedures. Interoperability also had to cover the ability to use the same data in multiple different systems, while interpreting the information consistently. Finally, some central infrastructure would be required to drive this initiative across the various nations' forces.

In a business context, interoperability provides the "connective tissue" and the change in mind-set and behavior that fosters collaboration across organizational boundaries. Just like in its military equivalent, what we term "Interoperability for Business" starts off with clearly articulating and communicating the vision behind the (new) way of working. It defines not only what is required to achieve that vision but also what should be de-emphasized, so that the scarce resources within the organization are applied against critical efforts. Culturally, Interoperability for Business includes steps to create the right environment for collaboration across organizational boundaries and performance acceleration. Knowledge—collecting as well as developing crucial information swiftly and directing it to the right parts of the organization in a way that can be understood and used by all—is essential. Another key challenge is the organization's ability to establish a structure and put the behaviors in place to share best practices.

One of the major benefits of Interoperability for Business is that it greatly improves cross-functional dialogue and puts in place the processes, i.e. "the glue," that allows each function to operate more efficiently. (Exhibit 1 shows some telling examples of what this could mean.)

Better dialogue and cooperation between manufacturing, distribution, sales and marketing, and even the customer, can lead to better decisions about which products should be made-to-order vs. made-to-stock. However, this requires that basic interoperability building blocks are in place. First, it needs to be clearly articulated and communicated to everyone, including to the customer, what service levels and lead times can be committed to and, internally, the information and metrics need to be in place to track against that commitment. All too often companies end up with large amounts of slow moving or obsolete inventory of make-to-order products because either someone in sales made a commitment that wasn't in line with the agreed-to policy or the customer did not hold up its part of the bargain and didn't accept the full minimum order quantity for make-to-order products.

Better Decision Making

In organizations that have successfully applied Interoperability for Business, communication and cooperation between the various functions will result in a fact-based, fast decision-making process and a clear set of actions. This process can then not only be applied to ad hoc MTO vs. MTS discussions, but also to make the right decisions and take the right course of action with regards to bigger, broader, and more complex situations, similar to those that arise when the next wild card event takes place.

A SPECIAL SUPPLEMENT TO:
SUPPLY CHAIN MANAGEMENT REVIEW

2013 Rate Outlook:

Our Rate Outlook panel believes that shippers need to be more creative than ever in controlling costs in 2013. Here is their perspective on six key sectors.

By Patrick Burnson

Fuel: Volatility to continue

Forecasting fuel rates has never been more difficult for the industry overall, maintains panelist Derik Andreoli, Ph.D.c., senior analyst at Mercator International LLC and *Logistics Management*'s popular Oil & Fuel columnist. According to Andreoli, when planning for 2013 energy fluctuations, logistics managers must keep an eye on several global issues.

"We need to watch what's going on in Iraq and Iran, wonder if shale gas drilling rates and natural gas production and consumption will remain stable, and ask if drilling rates and production of shale oil increase even as oil wells disappear," says Andreoli. "These are all questions looming large for shippers this new year."

Lacking a crystal ball, the best anyone can do is evaluate the fundamentals of global supply and global demand, notes Andreoli. For example, if demand grows faster than production capacity, then surplus production capacity—the world's buffer against actual supply shortfalls—will be diminished, and prices will rise. Conversely, if production capacity grows faster than demand, we should expect some easing in price volatility, though not necessarily price levels.

Logistics and transportation professionals can begin to reduce their exposure to risk by concentrating on packaging and materials handling, Andreoli advises. "Work with carriers to design an incentive program designed to reward carriers for increasing fuel efficiency," says Andreoli.

Trucking: Yield management top of mind

Stifel Nicolaus analyst John Larkin agrees that shippers need to take a look at the big picture and should closely monitor the results of the "fiscal cliff" negotiations and broader economic data reports in early 2013.

"If a rational solution is reached in Washington, chances are that the private sector will be more inclined to hire, invest, and grow at a faster rate than we have witnessed the past couple of years," says Larkin. "A better than expected economic scenario, along with significantly higher freight rates, could then result."

Conversely, adds Larkin, if war breaks out in the Middle East, or if China's growth prospects dim, domestic economic growth could disappoint. In that case, rates could weaken as demand wanes.

"Rates, particularly spot rates, could decline to very attractive levels," says Larkin. "So rather than reviewing a checklist, we think that shippers should remain diligent in their evaluation of the health of the economy. That discipline will best prepare shippers to respond to the changing landscape while lining up sufficient capacity at reasonable market-based prices."

Larkin and other analysts note that trucking rates are closely related to supply and demand in the marketplace. Assuming that the economy continues to grow at an annual rate of between 1.5 percent to 2 percent, shippers should expect supply and demand to remain roughly in balance.

"This is the same situation we have experienced for the better part of two years," he says. "Under this scenario, truckers should be able to eke out 1 percent to 2 percent annual increases in raw price in 2013. Carriers may be able to improve on the range by 100 to 200 basis points harnessing a process we like to call 'yield management.'" Yield management is nothing more than selecting the highest rated customers and the highest rated freight offered by particular customers.

"Shippers can help themselves tremendously by

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New Era of Collaboration

Peter Hoey

working collaboratively with carriers to improve the carriers' equipment utilization," says Larkin.

Rail/Intermodal: Transparency is key

Brooks Bentz, a partner in Accenture's supply chain management practice, says that intermodal shippers can shield themselves from unexpected rate hikes by negotiating contracts for a distribution network rather than by picking lanes.

"Shippers really became good at this during the recession," says Bentz, "and they'll continue to share information with one another—even with friendly competitors—if it's of mutual benefit."

Indeed, Bentz argues that the carriers themselves are becoming more transparent in their pricing. "Given that a wide variety of rail and intermodal producers are charged with delivering door-to-door transportation, the challenge has been magnified," he says. "That requires more integration and cooperation among carriers."

Meanwhile, intermodal growth continues to accelerate with the tremendous investments the railroads are making in infrastructure. According to the Intermodal Association of North America (IANA), domestic container volume recorded double-digit growth for the fourth quarter in a row in 2012.

"Every IANA region reflected an increase in domestic containers which were responsible for the majority of total third quarter intermodal gains," says IANA President and CEO Joni Casey.

Volumes were most impressive in the Midwest and the Northeast regions, with each recording nearly a 15 percent uptick. Overall, intermodal volume increased a

respectable 3.2 percent during the fourth quarter that exhibited some economic slowdowns.

"The largest overall cause of modest international intermodal volume increases continues to be weak port volume, as many shippers have been unwilling to bring in substantial inventories," says Casey.

Ocean: Capacity crunch on horizon?

As always, the freight rate outlook for container shipping will vary by route and by direction and will depend on the length of contracts, says analysts for the London-based consultancy Drewry Supply Chain Advisors.

"Overall, we predict a moderate increase in freight rates in 2013 of 3 percent to 6 percent in average east-west freight rates in 2013," says Philip Damas, Drewry's director. "Contract tenders currently being finalized for calendar 2013 also indicate this type of rate changes."

The fact that rates may rise in a weak market is partly because of the lag time of annual contract rates, he explains. In early 2013, annual contract rates that commenced in early 2012—at a time of a price war between ocean carriers—will expire. Slightly higher rates, adds Damas, will then replace these very low contract rates.

The fuel surcharge component of container freight rates will remain high in 2013 in line with the underlying marine fuel price trends. However, the container shipping market remains unstable, Drewry analysts say.

"We note that carriers have been losing money in 2011 and 2012 and are close to the point where they will need to reduce capacity to protect their cash flow," says Damas. "If the situation worsens, we could see a repeat of 2010 when capacity was slashed, freight rates were ratcheted up, and contracts were renegotiated."

So, how do shippers protect themselves? Drewry generally advises them to develop close relationships with core, preferred carriers, and to run detailed professional tenders, instead of trying to capitalize on attractive, short-term price reductions from unfamiliar or "opportunistic" carriers.

"We say this because of the continuing disruption in the market, which could result in the interruption of service, or in sudden freight rate increases, or in unilateral contract terminations," advises Damas. "Just look at the speed at which some small transpacific carriers pulled out of the market, with little or no notice, when rates fell."

Air Cargo: Rates remain steady

While air cargo volumes crept along at a snail's pace during most of 2012, the year ended without a last minute push for higher-value retail goods to fill space to capacity on cargo planes.

According to Charles "Chuck" Clowdis, managing director of transportation advisory services for IHS Global Insight, this slow growth still reflects rates that have remained stable for most of the past year.

"Even the dockside strikes at seaports last year did not last long enough to push goods from sea to air as inventory carrying stocks may have become threatened," says Clowdis. "It's our feeling that rates will continue to remain at present levels during the first quarter of 2013 and likely remain so unless there is a discernible economic recovery that will include robust consumer spending."

Clowdis predicts that mid-year spending may see a bit of an upturn for airfreight items if new electronic items are released. Meanwhile, he contends that some hope for a recovery exists for this summer.

"Likewise, consumer spending on relatively high value goods could return with a rise in the economy," says Clowdis. "But this scenario is unlikely. Six months into 2013 will find us most likely awaiting a change in the economic situation hopefully coupled with a drop in unemployment."

Parcel: Still surging

Late last year both FedEx and UPS announced parcel rate hikes, but according to Jerry Hempstead, president of parcel consultancy Hempstead Consulting, increases are "not linear by weight nor are they linear by zone." FedEx also increased many of the most frequently used accessorial service charges such as residential, address correction, delivery area, and extended area surcharges.

"The great concern to most shippers is the constant increase in 'minimum' charges," says Hempstead. Today the minimum charge for a ground package is $5.49 before the fuel surcharge. That will be increasing to $5.84, a 6.34 percent increase not accounting for the change in the fuel surcharge."

The United States Postal Service, a competitor in the two- to three-day air market also increased rates late last year. "But there is little overall organic package growth going on in the marketplace," says Hempstead. "As a result, they need to continually increase top line revenue by charging more."

So what can shippers do? They can protect themselves by developing a model that reflects buying patterns of services and distribution of packages by zone and weigh. "This is easily accomplished by downloading a shipment history from the carrier web site," says Hempstead. "Always remember that everything in life is negotiable. If you have grown your business with a carrier this past year, then perhaps the carrier should be rewarding you with lower costs in 2013."

To Obtain Value, Make Shared Services Centers Accessible

Organizations with procurement shared services centers have more efficient procurement processes but more maverick purchasing, according to APQC data.

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

To standardize and consolidate procurement efforts, many organizations have established shared services centers that manage procurement for multiple departments or the organization as a whole. According to APQC's *Open Standards Benchmarking in procurement*, 68 percent of responding organizations have initiated procurement shared services programs and 13 percent plan to initiate these programs in the next two years.

To determine how the establishment of a shared services program can affect the procurement function, APQC compared the performance of organizations with such programs against the performance of organizations without them with regard to specific procurement measures. The results of the analysis indicate that organizations with procurement shared services centers have faster purchase order processing and shorter procure-to-pay cycle times. However, these organizations also have higher procurement costs overall and a greater volume of maverick purchasing.

These results should lead organizations to take a closer look at their procurement shared services centers to determine whether the centers and their accompanying procurement processes are user-friendly.

Procurement Efficiency

APQC's data shows that organizations with procurement shared services programs are more efficient in purchasing materials and services than organizations that do not have these programs. Specifically, those with procurement shared services need less time to place purchase orders and have shorter procure-to-pay cycle times (see Exhibit 1).

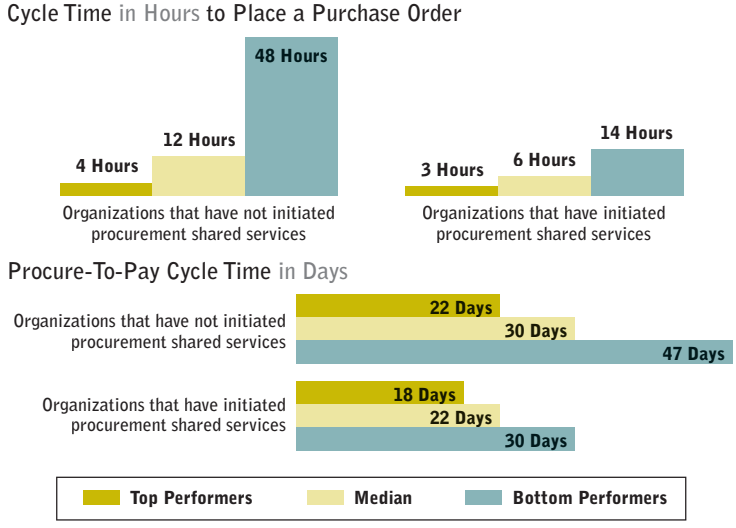
At the median, organizations with shared services centers take less than one business day to place a purchase order, whereas organizations without shared services programs take 1.5 business days. This can quickly add up to a significant amount of employee time devoted to placing purchase orders.

The performance gap between the two groups is also apparent with regard to procure-to-pay cycle times. At the median, the difference in time the organizations need to order, receive, and pay for goods is eight days—more than one week. The difference is even more significant among bottom performers; organizations without procurement shared services need 17 days more for the procure-to-pay cycle than those with shared services.

The better performance achieved by organizations with procurement shared services centers could be related to standardized and more thorough procurement processes. Procurement center staff vet suppliers and establish close relationships with core providers, which means that purchase orders to those suppliers can be issued faster. Having a centralized procurement

EXHIBIT 1

Procurement Shared Services and Efficiency



median, organizations with procurement shared services spend $5.80 per $1,000 in purchases to order materials and services, whereas those without procurement shared services spend $5.90 per $1,000 in purchases for this activity. Organizations that have initiated procurement shared services programs have more formal procurement and contracting processes, which means that they may spend more on the contract development process, supplier evaluations, and procurement systems.

Although increased spending for these items may result in higher procurement spending overall, it helps lower the cost of ordering materials by making the procurement process more efficient and by ensuring that the organization does business with suppliers that provide the best value.

function across business units also means that orders can be combined. If multiple departments want to purchase products that can be sourced from a single supplier, the shared services center can place one order for all the items. This can lead to faster processing and delivery than would have been achieved if separate orders were issued by various departments. It can also allow organizations to obtain volume discounts for ordering more items at once.

Supplier vetting could also be behind the shorter procure-to-pay cycle times achieved by organizations with procurement shared services. Establishing relationships with suppliers that are proven to be reliable reduces the amount of time needed to receive materials. The regular evaluation of suppliers that can be conducted by a shared services center allows organizations to coach lower-performing suppliers or to quickly identify the need for alternative sources of materials.

Procurement Costs

APQC's data also reveals that organizations with procurement shared services programs spend more on the procurement process as a whole per $1,000 in purchases than companies without such programs (see Exhibit 2). At the median, the difference in cost between the two groups is $1.26 per $1,000 in purchases ($8.87 vs. $7.61). For an organization making $1 billion in purchases annually, this would result in an additional $1.26 million in procurement cost associated with operating a shared services center.

However, organizations with procurement shared services programs spend slightly less to order materials and services than organizations without these programs. At the

Maverick Purchasing

Despite their more efficient procurement processes, organizations that have procurement shared services centers also have slightly more maverick purchasing than organizations without these centers. At the median, they make 1 percent of their annual purchases via maverick purchasing, whereas organizations without shared services centers make only 0.2 percent of their purchases via maverick spending.

Although the data does not show that procurement shared services centers directly cause the maverick purchasing seen in APQC's data, the results should spur organizations with procurement shared services centers to take a close look at these programs. To ensure that they are getting the maximum benefit, they should consider the following:

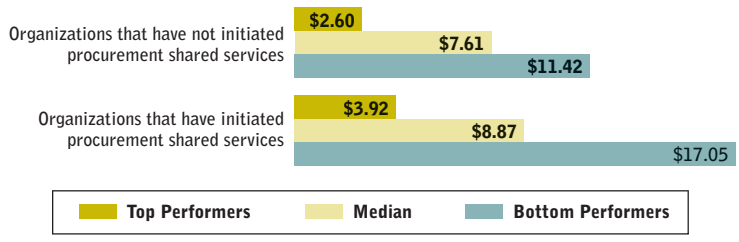
- Are employees intimidated by the idea of having another business unit handle all purchasing?
- Are the procurement mechanisms in place seen by employees as too complicated to use?
- Have employees received adequate training on how to use the procurement systems and make purchases through the shared services center?

By doing some research into why employees bypass

The better performance achieved by organizations with procurement shared services centers could be related to standardized and more thorough procurement processes.

EXHIBIT 2

Total Cost of the Procurement Process per $1,000 Purchases



central procurement units in favor of maverick purchasing, organizations can address employee concerns and improve procurement performance.

Keeping the User in Mind

APQC's research shows that organizations that have initiated procurement shared services programs have more efficient procurement processes, as illustrated by shorter procure-to-pay cycle times and fewer hours needed to place purchase orders. These results make a strong case for centralizing and standardizing procurement efforts.

If an organization has created a shared services center that employees do not want to use, it will see little or no benefit.

At the same time, organizations with procurement shared services centers also have higher procurement costs overall and greater amounts of maverick purchasing. Higher procurement costs could be related to the more sophisticated systems needed to manage the purchasing needs of multiple business units, or they could be related to additional time needed to vet or establish close relationships with suppliers. Because these organizations have slightly more maverick purchasing, the higher procurement costs could also be related to the less cost-effective purchasing made outside of formal procurement processes.

In order for procurement shared services centers to provide value, they should both relieve the burden of purchasing for employees in other business units and provide the organization with faster, more cost effective procurement than would have been achieved by multiple purchasing groups. Having formal procurement processes and a centralized group of purchasers should not be intimidating to employees or make purchasing unnecessarily complicated. If an organization has created a shared services center that employees do not want to use, it will see little or no benefit.

Organizations with procurement shared services centers should evaluate the use of these centers to see if they could be made more user-friendly. In addition, the procurement shared services programs should be leveraged to educate employees on formal procurement processes to ensure use. Although shared services centers may be related to higher procurement costs overall, faster processing of purchase orders and shorter procure-to-pay cycle times may make them worth the investment.

About APQC: A member-based nonprofit founded in 1977, APQC is the leading resource for performance analytics, best practices, process improvement, and knowledge management. For more information, visit www.apqc.org or call 713-681-4020.

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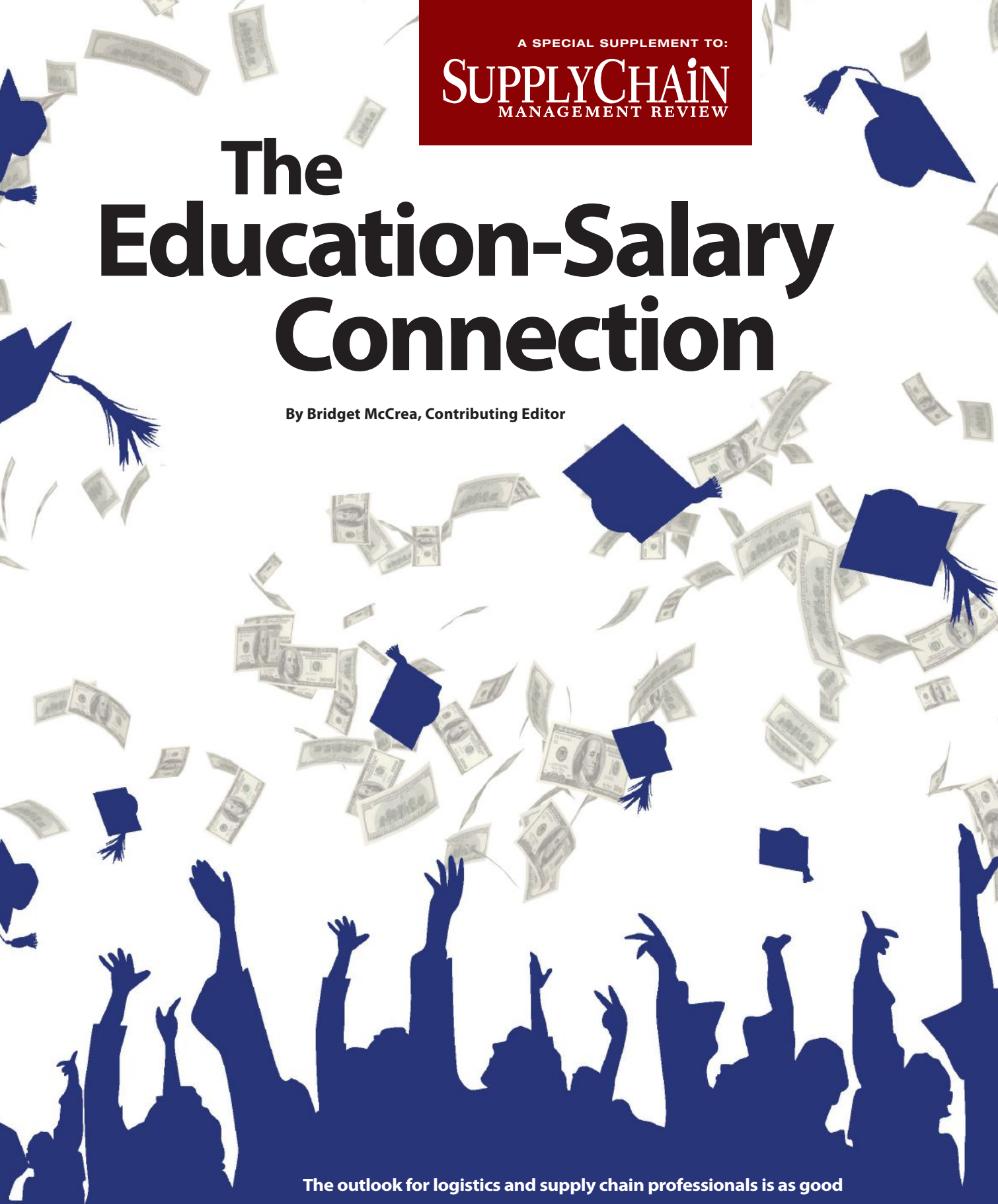
A SPECIAL SUPPLEMENT TO:
SUPPLY CHAIN MANAGEMENT REVIEW

The Education-Salary Connection

By Bridget McCrea, Contributing Editor



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The Eductation-Salary Connection

Robert Cook isn't having any trouble placing qualified supply chain program graduates in positions these days. A professor of marketing and logistics at Central Michigan University, Cook says his top undergrads are taking jobs right out of college that pay $52,000 to $60,000 annually, with the mid-range performers being offered positions that range from $46,000 to $47,000.

"Employers are hungry for qualified, educated, supply chain graduates," says Cook. Some companies are reaching farther back into the pool of current students and shelling out $20-per-hour salaries, housing, and company cars (complete with unlimited mileage) to interns. "Ford, Amway, Kimberly-Clark, and others just hauled 20 of our students out of here to be summer interns," says Cook. "Every one of them will earn $18-$20 per hour plus housing, at minimum."

Cook says several factors are driving the current recruiting rush. A retiring Baby Boomer generation and an "existing shortage of supply chain majors," are two key issues that companies are grappling with, he says. Add in the fact that the national economy is in slow-but-sure recovery mode with more companies paying attention to their supply chains and you wind up with a perfect storm that's sweeping up well-qualified candidates. "Employers can't get enough of supply chain graduates right now," says Cook, "and we can't turn them out fast enough."

Making the Connection

As companies compete for the fresh crops of supply chain graduates, the professionals who are already in such positions are also benefitting from their education credentials.

The 2012 *Logistics Management* Salary Survey, found that supply chain professionals earned an average annual salary of $99,600 in 2012, down from $107,800 in 2011. Breaking the numbers down along educational lines, those with a four-year degree averaged $111,515 annually while professionals holding MBAs earned $134,575. (See Exhibit 1.)

The dividing line between these individuals and their lesser-educated counterparts was clear in the 2012 survey, which found that professionals with two-year degrees earned $83,530 while those with "some college" or "high school" earned about $81,000 annually in 2012. The highest paid supply chain professionals hold titles like vice president/general manager, corporate division manager, and supply chain manager.

According to the salary survey, 46 percent of respondents had completed some type of formal education in supply chain and logistics. Those individuals earned an average annual salary of $116,500, while those who did not concentrate in supply chain/logistics brought home an average of $98,130. (See Exhibit 2.) Fifty-three percent of respondents planned to take continuing education within the next 12 months.

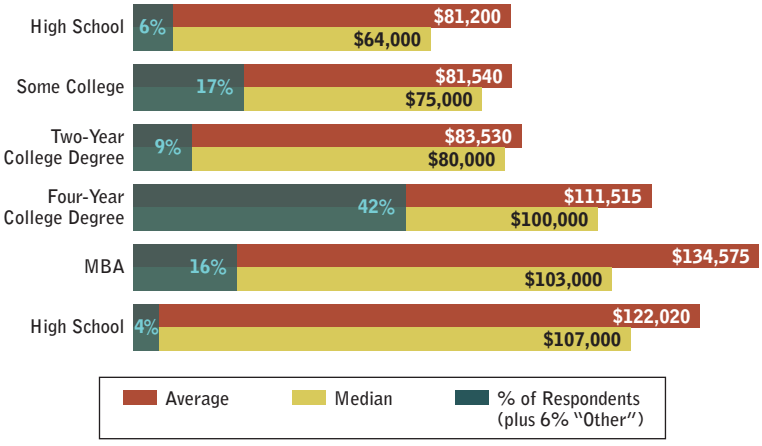
According to the *2012 Career Patterns in Logistics and Supply Chain Management* report from The Ohio State University's Fisher College of Business, the highest degrees attained for most of its survey respondents was graduate level (53.6 percent) and undergraduate level (40.1 percent). The MBA was the most frequent graduate degree, although other masters and doctorates were also represented as the "highest degrees." Ten percent of respondents also held professional certifications over and above their degrees.

About one third of the Ohio State University survey respondents—all of whom were Council of Supply Chain Management Professionals (CSCMP) members—held a degree or concentration in logistics at either the undergraduate or graduate levels. Most held upper-management positions with the largest category being directors (31 percent), followed by managers (26 percent), and vice presidents (18 percent). Salaries for presidents and vice presidents ranged from $95,000 to $300,000 annually; directors earned $100,000 to $225,000; and managers took home $75,000 to $150,000.

In assessing the correlation between education and salary within the supply chain and logistics arenas, Tim Stratman, president at Chicago-based Stratman Partners Executive Coaching, says college education has become essentially mandatory for both new and existing professionals within the field. "It's the ticket to the show," says Stratman. "You get into the show because you have a degree—preferably in supply chain management but

EXHIBIT 1

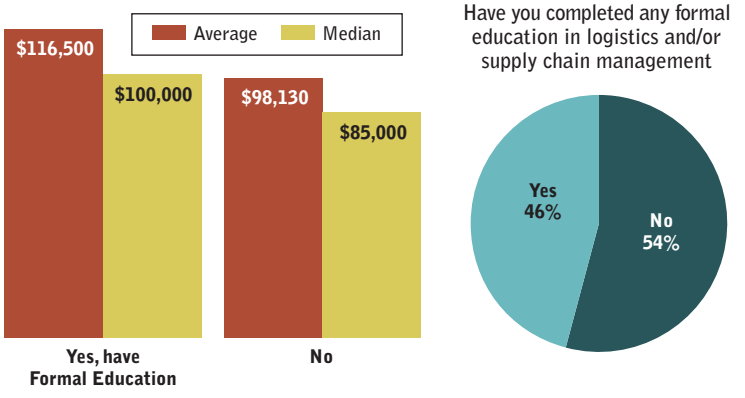
Salary by Education Level



Source: Peerless Research Group

EXHIBIT 2

Salary by Completion of Formal Education



Source: Peerless Research Group

possibly in operations management, engineering, or another technical area."

Just how well supply chain pros are able to leverage those "tickets" into job opportunities, promotions, and higher salaries is up to the individual himself or herself, Stratman points out. "Once you sign on with a company the rules change somewhat," he explains. "At that point instead of being [selected] based on education, you'll be assessed on what you bring to the table and the performance that you drive."

Achieving the delicate balance between technical proficiency and solid leadership skills is another important consideration for supply chain professionals looking to parlay education into higher salaries. That's where continuing education comes into play, says Stratman, who sees the best opportunities being made available to supply chain and logistics professionals who put time into continuous self-improvement.

Professional Development Counts

As evidenced by both the *Logistics Management* and Ohio State University surveys, supply chain and logistics professionals who are armed with advanced degrees are more likely to settle in at the high end of the industry pay scale. Cook says that supply chain managers who are vying for higher spots on the food chain should consider an MBA for its cross-functional capabilities, even if that degree is in finance or accounting (versus supply chain).

"The MBA is a degree that adds a lot of value for the logistics professional," says Cook. "In fact, you can hit a ceiling at some larger companies if you don't have an MBA. You get to the point where you just can't go any further." Cross-training within the company itself is also vital, says Cook.

"You can't get pigeonholed into a mono-functional area and expect to be promoted to the top," says Cook. "If you want to move on up the line you have to be cross-trained in purchasing, plant operations, inbound and outbound logistics, finance and accounting, and other functions."

Stewart Lumsden, a partner with Chicago-based executive search consulting firm Spencer Stuart, Inc., concurs with Cook and says companies are seeking out supply chain professionals who are equipped with broader business backgrounds. Lumsden, who leads his firm's Supply Chain Practice in North America, recruits across industries for a broad array of manufacturers, retailers, and service providers. In talking to his clientele, Lumsden says their ideal supply chain professional candidates are those who understand broader business concepts, how money is made, and the impact that the supply chain has on the bottom line.

"Finding candidates who bring that broader business vantage point to the table has become a priority for companies," says Lumsden.

"Particularly if it's on the manufacturing side, a technical degree is very appealing because of all the analytical rigor that goes on within the supply chain," Lumsden explains, noting that the advanced degree (the MBA) has become a differentiator for its holders because it displays broader business capacity. "Individuals can distinguish themselves in the industry by having that technical degree, and the underpinnings required, and then coupling that with the MBA. It's a very powerful combination."

Just Rewards

In assessing the relationship between education and earnings in the supply chain realm, Lumsden says that while individuals with degrees are exposed to more opportunities, whether they turn those chances into higher salaries is largely an individual exercise. "With the right educational mix and with a strong career trajectory," says Lumsden, "those individuals are going to be exposed to a lot of opportunity that will by its very nature allow them greater earning power."

As supply chain professionals assess their current positions, education, and opportunities, Stratman says it's important to understand that a multidimensional effort typically plays out best in the corporate world. "The goal should be to integrate education, experience, intellect, and emotional intelligence into a saleable package," says Stratman. "Then the advancement, promotions, and financial rewards will follow."

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

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www.olin.wustl.edu/Certificates
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www.wpcarey.asu.edu/exec

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Auburn University
334-844-4000
www.auburn.edu

Auburn's School of Business offers an undergraduate major in supply chain management. Focus includes transportation, logistics, and operations management.

Brigham Young University
Marriott School
801-422-3500
marriottschool.byu.edu

University offers a BS in Global Supply Chain Management. Coursework is designed to prepare students for managerial positions in manufacturing and service industries in the areas of purchasing, operations, logistics, customer service, and supply chain management.

Central Michigan University
800-688-4268
global.cmich.edu

Central Michigan University's Global Campus offers an online MBA degree in Logistics Management as well as other key business disciplines.

Georgia Institute of Technology
Executive Masters in International Logistics (EMIL)
404-385-7306
www.emil.gatech.edu/

The Executive Master's in International Logistics & Supply Chain Strategy program prepares executives to face key global logistics and supply chain issues by teaching them to design creative logistics solutions while expanding their network of international government, industry, and academic contacts. This 18-month program keeps employees on the job while teaching them practical techniques for decreasing logistics costs and improving supply chain efficiencies. Participants experience real-world results by learning best practices from world-leading experts in EMIL's five two-week residences (both in-person and distance learning) at key locations around the globe.

Georgia Institute of Technology
Supply Chain and Logistics Institute (SCL)
404-894-2343
www.pe.gatech.edu/scl-scmr

The Georgia Tech Supply Chain & Logistics Institute offers a comprehensive curriculum in Lean Supply Chain Operations, Warehousing, and Transportation. Courses are taught by world-renown Georgia Tech Faculty in the Global Learning Center in Atlanta. The Institute also runs industry outreach program and global research centers.

Golden Gate University
Edward S. Ageno School of Business
415-442-6500
www.ggu.edu

Golden Gate University offers undergraduate and graduate certifications in operations and supply chain management.

Indiana University
Kelley School of Business
877-785-4713
www.kd.iu.edu

Kelley Direct at Indiana University offers an MS in Global Supply Chain Management. This online graduate program can be completed on a flexible schedule from one to five years.

Massachusetts Institute of Technology (MIT)
Center for Transportation and Logistics
617-258-7267
ctl.mit.edu/

Every January and June, CTL delivers its late-breaking sup-

ply chain and logistics education and research to executives via "Supply Chain Management: Driving Strategic Advantage." This intensive five-day course features a comprehensive array of management simulations and case studies, interactive lectures and discussion sessions, and presentations by distinguished lecturers.

CTL also regularly partners with organizations to provide customized executive education experiences to individual enterprises and consortia. Custom courses give organizations the opportunity to direct intensive efforts at specific issues crucial to company goals, including business continuity strategy, scenario planning, and competitive alignment.

Michigan State University

Broad College of Business
517-353-6381
http://supplychain.broad.msu.edu

The Broad College of Business at Michigan State University offers a wide range of supply chain education programs at the undergraduate and graduate levels as well as executive education and online certification programs.

Included among these programs is the Masters of Science in Supply Chain Management. The MSSCM degree is a unique graduate program providing deep knowledge of supply chain practices and techniques in a structure that allows students to complete the program while working full time. For more information visit:

http://supplychain.broad.msu.edu/MSSCM/

MSU's supply chain management executive education programs cover key supply chain topics in courses that range from breakfast sessions to intensive week-long programs. Visit: http://execed.broad.msu.edu. For more on the online supply chain certificates offered, visit http://www.msuonline.com.

North Carolina State University

College of Management
919-515-5560
www.mgt.ncsu.edu

N.C. State offers undergraduate studies in Operations & Supply Chain concentration. The university's Supply Chain Resource Cooperative also provides a wealth of educational resources.

Northeastern University

College of Business Administration
617-373-3282
www.cba.neu.edu

Northeastern offers an MBA degree with supply chain concentration, plus a Certificate program in SCM. Also offers an online MBA degree program with an emphasis in Operations and Supply Chain Management (via five specialized, elective courses).

Northwestern University

Kellogg School of Management
847-467-7020
www.kellogg.northwestern.edu/execed

Northwestern offers the Supply Chain Management—Strategy and Planning for Effective Operations program.

The Ohio State University

Fisher College of Business
614-292-0331
fisher.osu.edu/centers/scm

Fisher College of Business offers executive education programs in supply chain management that focus on the management of essential business processes, both cross-functionally and with key members of the supply chain. In the seminar you will learn the key business processes: customer relationship management, supplier relationship management, demand management, order fulfillment, manufacturing flow management, product development and commercialization, returns management. Also included are sessions on The Partnership Model and The Collaboration Framework, tools that have been used by major corporations to structure relationships with key customers and suppliers.

Upcoming sessions in 2013:

- April 8- 2, 2013 , Ponte Vedra Beach, FL
- May 2 -23, 2013, Cranfield, England
- September 16-20, 2013, Columbus, OH
- November 11-13, 2013, Cranfield, England

Ohio State University

Fisher College of Business
614-292-8808
www.fisher.osu.edu

Ohio State offers undergraduate, masters, and PhD programs in supply chain/logistics as well as executive education programs. Fisher College of Business and College of Engineering also jointly offer a specialized program, Masters in Business Logistics Engineering (MBLE). Also offered are online courses in subjects such as lean Six Sigma as well as a series of Executive Update video sessions.

Penn State University

Smeal College of Business
814-865-3435
www.smeal.psu.edu/psep

Upcoming supply chain executive education programs include:

- Designing and Leading Competitive Supply Chains
  March 10- March 15, 2013
- Achieving Supply Chain Transformation
  March 18- March 22, 2013
- Essentials of Supply Chain Management
  April 8-April 12, 2013
- Global Supply Chain Strategy & Risk Management
  April 22, 2013
- Supply Chain Collaboration and Alignment
  May 7, 2013
- Processes and Tools for Supply Chain Success
  May 19, 2013

Rutgers University

Rutgers Business School
973-353-5226
www.business.rutgers.edu/scmms

The Department of Supply Chain Management and Marketing Sciences (SCMMS) at Rutgers Business School offers a range of academic programs including a PhD in SCMMS, an MBA Concentration in Supply Chain Management and an undergraduate major in SCMMS. Rutgers also offers executive education programs based on current topics and trends. Also offered is a Supply Chain Management Certification Program for business professionals.

Stanford University

Graduate School of Business
650-724-6301
www.gsb.stanford.edu/exed

The Graduate School of Business is offering a program "Strategies and Leadership in Supply Chains." Program is designed for executives who have strategic responsibilities for SCM, manufacturing, operations,

logistics, distribution, or procurement.

Syracuse University

Whitman School of Management
315-443-3751
www.whitman.syr.edu/scm

The Whitman School offers B.S., MBA, and PhD programs in Supply Chain Management. Focus areas: demand management, inventory control, risk sharing, supply chain planning, information flows, transportation, production management, and global b-to-b marketing. Six Sigma training is also offered.

Texas A&M University

Mays Business School
979-845-1616
www.business.tamu.edu

The Mays Business School offers a Supply Chain Management major as part of its BBA in Information & Operations Management.

Washington University in St. Louis

Olin Business School
314-935-9494
www.olin.wustl.edu/Certificates

The Olin Business School at Washington University in St. Louis offers Supply Chain Certificate for Managers. The program is designed to improve the student's ability to drive organizational effectiveness. It takes place over the course of three two-day modules that cover (1) Managing the Supply Chain as a System; (2) Managing Supply and Demand; and (3) Supply Chain Analytics.

The World Academy

908-354-7746
www.theworldacademy.com

The Academy provides training programs and seminars in all phases of export/import logistics, hazardous materials (HAZMAT), letters of credit, communications, harmonized tariff schedules, and INCO terms.

University of Arkansas

Sam M. Walton College of Business
479-575-6142
www.waltoncollege.uark.edu

The Marketing and Logistics Department at Walton College offers a B.S. in Business Administration (Transportation and Logistics Major) and a B.S. in International Business (Logistics Concentration). Also operates the SCM Research Center and RFID Research Center.

Upcoming event:

- 2013 Logistics Doctoral Symposium
  April 4-April 6, 2013

University of Denver

303-871-4702
www.du.edu/transportation

The ITI Executive Masters Program offers an interdisciplinary curriculum delivered as integrated modules. The curriculum and delivery have been designed to meet the needs of transportation professionals and public-sector administrators and planners. The five, one-week residencies on the University of Denver campus allow for face-to-face interaction between the faculty team and the program participants, which the University of Denver considers to be a fundamental principle of education. A variety of teaching methods are used, and group discussions, team projects, and offsite activities supplement the more traditional lecture format.

University of Maryland

R.H. Smith College of Business
301-405-2189
www.rhsmith.umd.edu

The R.H. Smith College of Business offers executive education programs through the Supply Chain Management Center. The Supply Chain Management Fellows Program offers students a unique opportunity for learning both within the Smith School and with external Supply Chain professionals.

University of Michigan

Ross School of Business
734-763-7804
http://execed.bus.umich.edu/

The Ross School offers a one-year Master in Supply Chain Management degree. Also offers an executive education course in Supply Chain Design and Execution for Global Markets.

University of San Diego

Supply Chain Management Institute
619-260-4600
www.sandiego.edu/scmi

Program emphasizes a community of learners, limits class size, and incorporates company-related projects to give participants an educational experience relevant to their specific career objectives. Classes for this 36-unit program cover SCM and Logistics, Supply Chain Systems, Global SCM, and World Class Supply Management. Offerings include a Master of Science in Supply Chain Management (MS-SCM) and a Graduate Certificate in Supply Chain Management (GC-SCM).

University of San Francisco

800-609-4196
www.usanfranonline.com/ism

USF offers an online interactive Master Certificate program for Supply Chain Management. Also offers an Advanced Professional Supply Chain Certificate and an Advanced Professional Sustainable Supply Chain Certificate.

University of Tennessee

College of Business Administration
865-974-5001
http://supplychain.utk.edu

The school's Integrated Supply Chain Management Program helps participants develop a better understanding of the complexities and interrelationships among the supply chain areas of demand planning, customer relationship management, operations, logistics, lean management, and resource/financial management. The program is composed of six, two-and-one-half day courses. Taught by UT's internationally renowned faculty, these courses consistently have been ranked among the best in the field. Courses are offered up to twice per year. The school also offers graduate and undergraduate degrees in supply chain management.

University of Wisconsin-Madison

Executive Education Center
608-441-7357
exed.wisc.edu/supplychain

The following events in Purchasing and Supply Management are scheduled:

- Supply Chain Optimization
  March 7-March 8, 2013
- Supply Chain Leadership
  March 20-March 22, 2013
- Supply Chain Collaboration

March 23-March 24, 2013

- Supply Chain Risk: Ensuring Supplier Performance and Business Continuity in a Global Sourcing Market
  May 6-May 7, 2013

Walden University

866-492-5336
www.waldenu.edu

The University offers online management programs including a PhD in Applied Management and Decision Science, an MBA, M.S., and B.S. in Information Systems and a B.S. in Business Administration.

PROFESSIONAL ASSOCIATIONS

APICS

800-444-2742
www.apics.org

APICS offers two certification programs, national and regional conferences, online events, and self-study programs.

CSCMP (Council of Supply Chain Management Professionals)

630-574-0985
cscmp.org/

CSCMP's global conference brings together thousands of supply chain professionals from all over the world to exchange ideas and share knowledge. Also conducts local roundtables across the country and the globe and offers a variety of supply chain Webinars. CSCMP's Online University offers members and potential members easy access to the latest in logistics and supply chain management. Upcoming events include:

- Fundamentals of Supply Chain Management
  March 11-March 12, 2013
- Sales and Operations Planning
  April 8-April 9, 2013
- Transportation: Challenges and Solutions
  April 22-April 23, 2013
- From Strategy to Reality: How SCM Turns Ideas into Results
  May 6-May 7, 2013
- Fundamentals of Supply Chain Management
  May 20-May 21, 2013

ISM (Institute for Supply Management)

480-752-6276
www.ism.ws/

ISM offers certification programs, seminars, professional development services, and online courses for the supply management professional. It also features an annual Conference and Educational Exhibit and provides in-depth research on supply management topics through affiliation with CAPS Research. Following events are:

- 10th Annual Black Executive Supply

Management Summit
New Orleans, Louisiana
February 5-February 7, 2013

- 5th Annual Women Executive Supply Management Summit
New Orleans, Louisiana
February 5-February 7, 2013
- 23rd Annual North American Research Symposium (NARS) on Purchasing and Supply Chain Management
Phoenix, Arizona
March 14-March 15, 2013
- Eighth Annual Institute for Supply Management™—Michigan State University Awards for Excellence in Supply Management and the Tenth Annual R. Gene Richter Scholarship Awards, Dallas, Texas, April 28, 2013
- ISM 98th Annual International Supply Management Conference & Educational Exhibit
Grapevine, Texas (Dallas)
April 28-May 1, 2013

NITL (National Industrial Transportation League)

703-524-5011
www.nitl.org/

The League represents shippers in their dealings with various regulatory bodies. Provides educational forums, annual conferences, and industry exhibitions through an annual TransComp event.

SIG (Sourcing Interests Group)

530- 582-8600
www.sourcinginterests.org

SIG provides summits, global regional conferences, and web-based learning to enable members to network and build relationships. Following events are:

- SIG's Minneapolis Symposium
Minneapolis, Minnesota
January 17, 2013
- SIG's Sydney Symposium
Sydney, Australia
February 28, 2013
- SIG's London Symposium
London, United Kingdom
March 27, 2013
- SIG Global Sourcing Summit
Amelia Island, Florida
May14-May 16, 2013

Supply Chain Council

202-962-0440
www.supply-chain.org/

Through the Supply Chain World conference, the Council provides a forum for supply chain and business executives to identify opportunities to improve financial and supply chain performance. Presents a benchmarking database by which companies can compare their supply chain performance to others; also offers training in the SCOR model. Following events are:

- Global User Meeting
St. Louis, Missouri, April 8, 2013
- Supply Chain World North America
St. Louis, Missouri
April 8-April 10, 2013

TRB
(Transportation Research Board)

202-334-2000
http://www.trb.org

TRB is one of six major divisions of the National Research Council. This agency offers conferences, workshops, research, and e-sessions to the transportation community.

VICS

(609) 620-4590
www.vics.org

Organization provides online education, workshops and a 3-day certification program. Collaborative Planning, Forecasting, and Replenishment (CPFR®) is an initiative that highlights the importance of collaboration and the benefits of a demand driven supply chain. An Introduction to CPFR e-Education is designed to introduce students to CPFR concepts and demonstrate the benefits and synergy of CPFR with other company initiatives such as category management and sales and operations planning. Following events are:

- CPFR® Certification,
  Hosted by GS1 US
  Lawrenceville, New Jersey
  January 8-January 9, 2013
- Retail's Big Show 2013
  New York City, New York
  January 13-January 16, 2013
- GS1 Connect 2013
  San Antonio, Texas
  June 10-June 13, 2013

WERC
(Warehousing Education & Research Council)

630-990-0001
https://www.werc.org

WERC is a professional organization focused on warehouse management and its role in the supply chain. WERC offers seminar, conference sessions, e-learning opportunities, and webcasts. The following event is scheduled:

- The Conference for Logistic Professionals 2013
  Dallas, Texas
  April 28-May 1, 2013

PRIVATE FIRMS

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Supply Chain Academy
www.supplychainacademy.com

The Supply Chain Academy offers over 400 online courses across many of the functional areas of the supply chain. Classes are presented via online self-study, virtual classroom sessions, or through instructor-led delivery.

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