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July/August 2010 Volume 14, Number 4

# SUPPLY CHAIN MANAGEMENT REVIEW

## FEATURES



## COMMENTARY



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# The Power of Planning

**Frank Quinn, Editor**
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I've always liked that old saying that good fortune favors the prepared mind (though I've faltered in my adherence to the principle as often as not). Reading the feature articles in this July/August issue of *SCMR* only affirms the validity of that wisdom, this time in a supply chain context.

From several instructive perspectives we learn about the value of carefully thinking about what you want to accomplish, how you want to accomplish it, and why you need to be flexible enough to respond if things don't go exactly to plan. As our cover illustration suggests, it's really about executing a supply chain game plan.

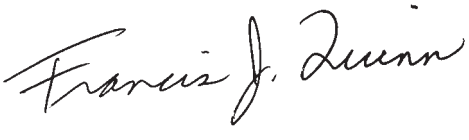
One of the most important areas of planning—and unfortunately one of the most overlooked—relates to your suppliers. As Michigan State educator Steven Melnyk and his research team point out in their article, most companies focus only on the here and now when it comes to the supply base. They worry about existing vendors and sources of supply, which of course they should. Problem is, it stops there. The authors advocate a far-reaching plan for supplier development that not only embraces current suppliers, but also future suppliers and even suppliers that may have been dropped in the past. They call this approach Supplier Base Management, and draw an entertaining analogy to the professional baseball system to illustrate how it works.

Certainly, planning needs to take center stage when you're making decisions about where to locate distribution centers and other operating facilities, especially on a global scale. And one of the core considerations of that facilities planning process are the related tax implications. The article here on multinational tax planning sheds light on this complex yet critical topic. In particular, it zeroes in on three specific areas of interest for supply chain professionals: foreign tax credits, tax deferral, and transfer pricing.

And whether you're designing your supply chain for global operations, or just domestic or even regional markets, you must ensure that you can respond swiftly and efficiently to market changes—a certainty in today's business environment. The best way to do that, say Thomas Olavson, Hau Lee, and Gavin DeNyse in their article, is by designing more than one supply chain. They call it the "portfolio" approach to supply chain design, holding up Hewlett-Packard as an exemplar of that technique.

Not surprisingly, planning receives prominent mention in our feature article on the ten traits of the best supply chains. In fact, Trait No. 7 is titled "Proficiency in Planning and Responsiveness."

Supply chain success today demands a lot of things, with planning and preparation clearly in the top tier. And if careful preparation and planning of your supply chain activities leads to good fortune, consider yourself more than lucky.



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BY LARRY LAPIDE

# Don't Resist Complexity and Risk

***The most successful companies excel at managing complexity and mitigating risk. This is what makes them competitive.***

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.

I RECENTLY PRESENTED TO A GROUP of supply chain managers in Buenos Aires, along with another educator from Spain and two practitioners from Argentina. The conference organizer closed out the conference with a question-and-answer period during which the speakers were assembled as a panel to answer questions from the audience. The first questions that we got were relatively easy since they related to what we had talked about during our presentations. Towards the end of the session the moderator asked us the most difficult question: "If you had one thing to tell these supply chain managers, what would it be?" This question would not have been hard to answer had we been warned in advance that it would be asked. Since we weren't, we all looked at each other stupefied, searching for what to say. Always willing to offer my opinion, I finally spoke up and said that I would give it a try.

I said that supply chain managers should be embracing not resisting complexity and risk. I added that the most successful companies are those that are best at managing complexity and mitigating risk. This is what makes them competitive. I then went on to elaborate on my answer.

Would I have given a different answer had I known the question in advance? Not really. I think it's still a good response, as I discuss below.

## Complexity and Risk Not Necessarily Bad

As I pointed out to the audience, I've attended many conferences and heard my share of supply chain managers complaining about product proliferation in their companies—as if this were a bad thing in and of itself. Companies offer myriad products to generate more business, and that should be a good thing if done well. They also open more sales and distribution channels. And while this further adds to complexity, it is done to increase revenues and sustain profits.

Other managers complain that demand forecasts are never accurate enough. They mistakenly believe that if forecasts were perfect, that would be the solution to all supply chain problems. Hearing this, I point out that while companies should do all they can to increase forecast accuracy, the forecast is ultimately limited by uncertainty in demand. Accuracy is probably not going to get that much better and may even get worse. Successful companies continually take on more risk, such as by introducing new products and entering new markets. And that means customer demand might become more uncertain, and forecast accuracy worse.

The Risk-vs-Reward Curve dictates that the more risk one takes on, the greater the potential to reap big rewards. Furthermore, the riskier the business/industry, the higher the operating margins and profits generated over the long-run. In fact, companies that don't continually take on new risks are likely to die over time. Thus, inaccurate demand forecasts and risk are not necessarily bad things.

## Managing under Complexity

While adding to complexity by marketing more products and services to more markets and increasing sales channels might generate more business, supply chain managers should not agree to increase complexity without making sure that the decision to do so is sound. However, simply resisting complexity is usually counter-productive. Managers should help make sure that increased complexity is profitable. One way to do this is to apply simple solutions—usually enabled by technology—to manage complex supply chains. Another is to help the corporation understand the impacts of increasing complexity, especially on supply chain costs, inventories, and profits.

Simple solutions to manage complexity often involve segmentation in a balanced "Goldilocks" way—that is, with not too many segments, yet not too few, but "just right." Treating customers, products, and suppliers in one way is usually not optimal; yet treating each one completely different is too unwieldy, cumbersome, and inefficient. Supply chain managers should play a major role in crafting the most profitable and manageable menu of "packaged services" to be offered to customer segments. Similarly, they should ensure that suppliers and products are efficiently segmented and managed.

Complexity generally increases the costs of doing business in ways that are not always easy to assess. Marketing and sales management want to increase complexity to drive more business. Yet they often do not know the impact on costs and inventories…or profitability. Supply chain managers need to conduct detailed analyses to help their executives decide on which complexity changes to make. However, using product proliferation as an example, profitability analyses need to take a "corporate" view and incorporate the importance of product loss leaders, rather than jumping to a conclusion that all unprofitable products should be terminated.

## Coping with Increased Risks

Supply chain managers need to help executives understand the impact of taking on increased risk as well as the risk management mitigation techniques available. With regard to the first point, doing whatever it takes to improve forecasting accuracy is one way to both understand and minimize the risk. More importantly, supply chain managers need to assess and analyze the full impact of increased risks on costs, inventories, and profits. This might involve the use of scenario planning in which detailed cost and inventory analyses are conducted under a variety of business situations.

Supply chain managers also need to understand the demand uncertainties associated with the risks and then apply risk management methods to mitigate them. This might involve segmentation to apply more effort on the most important business segment; it could also mean the deployment of supply chain "buffers" such as safety stocks and excess capacities. For more on risk management see my *SCMR* Insights columns, "Risk and the Planning Process (October 2009) and "How Buffers Can Mitigate Risk" (April 2008).

**Supply chain managers need to understand the demand uncertainties associated with the risks and then apply risk management methods to mitigate them.**

In short, I could have given a lot of other advice to the supply chain managers at that conference. But based on the arguments I just put forward, I'm convinced that this was the soundest advice I could have offered. By following it, managers can take a giant step toward making their companies very competitive and successful in the long run.

# Good Time to Rethink European Distribution

**By David Bovet**

Why should U.S. companies focus on their distribution networks in Europe? Headlines about Greek sovereign debt and German unhappiness at "rescuing" the euro could give pause to expansion strategies aimed at Transatlantic markets.

Yet the European Union (EU) remains a $16 trillion economy, the world's largest. Many U.S. companies are seeking to further diversify their business globally, hedging bets and searching for new geographies. American exports to the EU are up 3.5 percent, in nominal dollar terms, this year (January-April) over 2009. Meanwhile, despite a reversal in the past few months, the U.S. dollar is still down by 27 percent versus the euro since ATMs across Europe first started dispensing the new currency in January 2002. And Europeans remain among the wealthiest consumers in the world—six countries in Europe currently have higher nominal GDP per capita levels than the United States.

## Drivers of Location Decisions

Where to begin in thinking about establishing, growing or simplifying a European distribution network? Whether starting from scratch or adjusting current locations, it's critical to consider the customer base, projected growth and service requirements. Product characteristics, such as demand variability and freight intensity, are also essential ingredients in setting network parameters.

Logistical considerations span three key aspects of the supply chain:

***1. Market proximity (outbound)***

- Reaching European customers quickly and cheaply. (For many, overnight truck delivery; for others, rail and inland waterway access.)
- Avoiding congestion and restrictions.
- Minimizing "last mile" cost to customers.

***2. Gateway logistics (inbound)***

- Inbound sourcing (e.g., from China, United States, Eastern Europe).
- Proximity and capacity of seaports, airports, autoroutes.

***3. Hub efficiency (DC operations)***

- Occupancy or outsourced hub costs.
- Management, labor skills, cost and flexibility.
- Tax levels and incentives.
- Regulatory ease of doing business.

The optimal solution, in terms of total delivered cost and service, will vary from one company and industry to another. But as in the U.S., certain patterns are apparent that bracket the likely answer for many businesses.

## European Distribution Patterns

Wealth and income remain concentrated in Europe's west and north. The "Blue Banana" of wealth in Europe cuts a swath roughly from Birmingham in the UK, across the Channel to the Benelux countries, through Germany, France, Switzerland and northern Italy to end up in Madrid, Spain. This is still true despite the dramatic expansion of the EU towards the east and south. While manufacturing has moved eastward to lower-cost areas, wealth itself remains—for now—in the traditional heartland of Western Europe. For example, GDP per capita is $48,000 for the Netherlands versus $11,000 for Poland.

Traditionally, the Benelux countries (Belgium, Holland and Luxembourg) have been major locations for European distribution centers. This is driven by a number of natural advantages, including proximity to major gateways:

- *Seaports:* Rotterdam and Antwerp are Europe's two leading container ports, together handling 17 million TEUs in 2009.
- *Airports:* Airfreight is also well-served in these countries, with the four main airports

David Bovet is a partner at Norbridge, Inc., where he leads the supply chain consulting practice. He can be reached at dbovet@norbridgeinc.com.

(Amsterdam, Brussels, Luxembourg and Liège) handling about 3 million metric tons of cargo per year.

In addition to excellent gateway infrastructure, the international distribution role is highly developed in these countries. Clear strengths include:

• *International trade genes.* The Netherlands, in particular, has been trading for centuries.

• *Language capabilities.* The Dutch typically speak two languages other than their own—English, German, often French or Spanish as well. Staffing a customer service center that covers much of Europe is relatively easy to do in the Benelux countries.

**This is an opportune time to assess your European distribution network.**

• *Road links.* Benelux is closely tied to the major European markets.

• *Management and labor.* These countries excel in producing well-educated and experienced warehousing and transportation professionals.

• *Government policies and incentives.* The Netherlands, Belgium (both Flanders and Wallonia), and Luxembourg all offer favorable tax rates and incentives.

The downsides to these locations, particularly in parts of the Netherlands, reflect the consequences of their own success over the years. Road congestion can be a major problem. The population density and limited land for expansion make road freight movement slow in many parts of the Benelux, particularly along the axis from Antwerp to Amsterdam. Building costs can be problematical, too. Due to the scarcity of land and the existing high density of construction, the Netherlands is not low-cost in terms of DC space. However, parts of Belgium (Liège, Hainaut) are not as developed and offer reasonable real estate costs.

## Recent Activity

Where are companies locating their European DCs at present and why? Despite the global recession, new facilities are being built and public agencies are more focused than ever on attracting certain kinds of investment to their region. Here are a few examples that illustrate recent activity and the underlying rationale.

***The Netherlands.*** Several U.S. companies have announced new distribution facilities in the Netherlands this year, for example:

• Warnaco Group, a U.S. apparel maker (with brands such as Calvin Klein and Speedo), is building a 30,000 square meter European distribution center near Roosendaal (midway between Rotterdam and Antwerp). Warnaco is consolidating its operations, closing distribution centers in France and Italy as well as an existing logistics site elsewhere in Holland.

• Stryker, a U.S. medical technology company, is partnering with property developer Goodman to build a new 7,875 square meter warehouse in Venlo, Holland, which will gain sustainability certification.

***Wallonia in Belgium.*** This is the French-speaking area, in the southern half of the country. A recent study named Wallonia the best European DC location, because of its available land, incentives offered and good transport infrastructure toward the south. Examples:

• Hennes & Mauritz (H&M), the global Swedish-based apparel retailer, recently announced its selection of a site in Hainaut, Belgium, for distribution of garments all across southern Europe. Wallonia was the group's first choice because of the attractive price of greenfield land, the quality of the work force and the availability of investment grants.

• Skechers, a U.S. footwear maker, recently expanded its European logistics center in Liège to 41,000 square meters.

***Other regions of Europe.*** Much depends on target markets and on sourcing.

• To serve the Nordics, for instance, the Copenhagen area is ideal. This is due to the overnight truck delivery possible to some 80 percent of the population in Denmark, Norway and Sweden. The Øresund Bridge, an 8-km engineering marvel, now directly links Denmark with Sweden. Distances are too great, from the Benelux, to support next-day truck delivery to this area.

• Distribution centers are also being built in the eastern countries of the EU, where manufacturing has expanded rapidly. Poland, Hungary, Czech Republic and Romania, for example, have all gained new plants and DCs in recent years. Dell and Lenovo build notebook computers, and Delphi makes auto parts, in Poland. About 1 million square meters of warehouse space was leased in Poland during 2009. And U.S. logistics facility developer ProLogis had half its total European rentable DC space in the Czech Republic, Hungary, Poland, Romania and Slovakia, at end-2009.

## Bottom Line

The economic recovery is uneven in Europe, as in the United States. Yet for American companies, this can be a good time to acquire space for expansion or to consolidate older country-level DCs to a single site.

The market strategies, understanding of customer needs, and considerations involved in designing an effective European distribution network and locating key DCs are more complex than in the U.S. National and regional differences in transport infrastructure, land availability, tax incentives, and worker skills are all important considerations in making successful decisions.

# Securing the Pharmaceutical Supply Chain

***New technologies are emerging that will help supply chain managers combat the growing global problem of counterfeit drugs.***

**By Duane Sword**

On June 2, 1967, a *Time* magazine article opened with this paragraph: "One of the newest and least-known rackets in the U.S. today is the traffic in stolen, counterfeit, outdated and smuggled, substandard drugs…The racket is growing, and with it, the potential danger to unsuspecting patients."

Fast-forward more than 40 years and we see headlines like, "FDA Warns Consumers about Counterfeit Alli," "Dangers Lurk in Impotence Drugs Sold on Web," and "Heparin Find May Point to Chinese Counterfeiting." Though the issue of counterfeit and substandard drugs in the supply chain was highlighted by TIME four decades ago, the problem is still around and has now escalated into a global issue that is increasing in size and severity.

According to the Pharmaceutical Security Institute, the number of counterfeit drug incidents that occurred last year across the globe has increased 10 times compared to when the figure was first tracked in 2002 (See Exhibit 1). The World Health Organization (WHO) estimates that more than 50 percent of drugs sold online have been falsified or altered in some way and up to 25 percent of the total medicine supply in less developed countries is counterfeit. Most shocking, WHO estimates that one million deaths occur from counterfeit or substandard malaria drugs every year.

Duane Sword is vice president of Thermo Fisher Scientific.

## Supply Chain Vulnerabilities

Once a drug leaves its manufacturer, it enters a world where it can be adulterated, completely faked, diluted, relabeled or repackaged without authorization. Trying to pinpoint the exact vulnerabilities in the supply chain is almost impossible. While the U.S., Europe and other regions with well-developed supply chains are relatively secure, occasionally counterfeit products are introduced through a wholesaler or via re-packagers involved in the legal parallel trade system in Europe. The Internet presents yet another loophole and by far the biggest risk for patients.

In developing countries, there are multiple weaknesses in the supply chain. These include ports lacking the resources for proper inspection, drug application processes that are underdeveloped, single doses often sold outside of original packaging, and the availability of drugs in unauthorized markets.

In addition to watching for vulnerabilities during distribution, supply chain executives need to scrutinize raw materials, especially from contract manufacturers. The Heparin incident mentioned above occurred after a $900 per pound ingredient was sourced from China for $9 per pound. Though the price was attractive, the raw material from China was toxic and resulted in more than 80 deaths, each of which could have been avoided.

## Applying Technology to the Challenge

Supply chain executives in the pharmaceutical industry have tried to ensure a safe drug supply through a combination of laboratory testing and

packaging technology. New technologies have emerged that are helping the industry stay ahead of counterfeiters. These emerging technologies include the following:

## SMS

One of the newest technologies available to combat counterfeiting is SMS, or text messaging. SMS solutions work by affixing a unique code to drug packaging. Once a consumer purchases the drug, he or she reveals the code by scratching it with a coin. The consumer then text messages the unique code to a "mobile authentication service" and receives an immediate response that identifies the drug as legitimate or counterfeit.

Pilot studies have shown this technique to be effective, though it requires that manufacturers alter the drug's packaging to accept the unique code.

## RFID/e-Pedigree

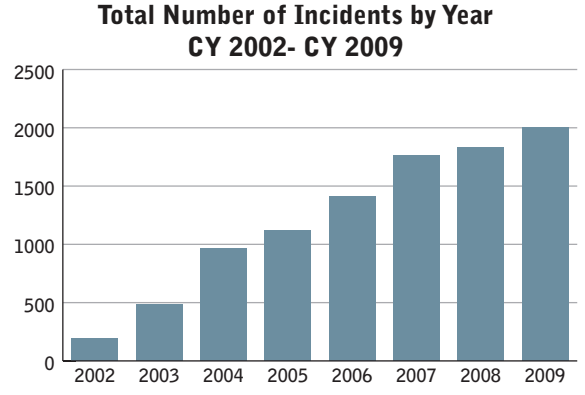
An electronic pedigree is an electronic document that tracks basic data elements of a drug as it travels through the supply chain. Information such as lot number, potency, expiration, manufacturer and other data elements are tracked on an RFID tag from the time a drug is manufactured to final dispensation.

The e-pedigree secures the chain of custody, preventing phony transactions and products from getting into or remaining in the legitimate supply chain. Electronic pedigree systems can detect counterfeit and diverted products by analyzing transaction details and suspicious patterns.

The downside is that RFID is costly and each individual pallet or package requires an RFID chip. And while the cost is decreasing, each chip still generally costs between 7-15 cents. There are also unsettled questions about whether the radio frequencies used to read the tags may impact sensitive biologic materials.

Like any packaging technology, another issue is that this technology does not secure the product itself, making it largely irrelevant in markets where the product is sold without its original packaging. In the case of e-pedigree, the system only works if the data is checked at the final point of dispensation; in other words, if the pharmacist doesn't review the e-pedigree, the exercise is futile.

EXHIBIT 1




Source: Pharmaceutical Security Institute, 2010

## Thin Layer Chromatography

Thin layer chromatography, or TLC, is a relatively low-tech solution involving traditional wet chemistry tests. These tests are comparatively inexpensive to conduct and are good at determining whether a particular product has the appropriate amount of the active ingredient. The Global Pharma Health Fund has developed a kit called the Minilab that can ascertain the quality of 52 common drugs. The Minilab is used in 70 countries around the world, but can only test the 52 products for which it was designed. Because of its size and weight, the kit is not ideal for field use.

## Spectroscopy

The combination of near-infrared (NIR) spectroscopy in the laboratory and portable Raman spectroscopy in the field can be used to accurately identify the chemical make-up of raw materials and finished products at ports of inspection, loading docks, points of sale and manufacturing plants.

NIR is a well-known spectroscopic technique that measures molecular vibrations and can be used to identify the individual chemical components of a drug or raw material. Because NIR is less selective than other forms of vibrational spectroscopy, it is susceptible to environmental factors like temperature and humidity in the field, which can lead to false positives with authentic products.

Raman spectroscopy is less well-known, but has been a game-changer in the industry since becoming available as a portable, handheld instrument. This technology can be used in the supply chain to accurately identify chemicals without direct contact with the substance, through sealed glass, plastic bottles, bags and blister packs. Raman spectroscopy uses a laser to illuminate a sample and measure the molecular shift that occurs. Handheld Raman spectroscopy has been used by a majority of the largest pharmaceutical manufacturers, as well as by regulatory bodies around the world.

Though the issue of counterfeit and substandard drugs is not new, supply chain practitioners are faced with securing an increasingly complex supply chain while battling increasingly sophisticated counterfeiters. New technological advancements enable pharmaceutical companies and regulatory bodies to secure drug packaging, accurately identify substandard materials before they enter a manufacturing facility and authenticate drugs in the field, from ports to point of sale.



# The Practical Professor: David J. Closs

By John Kerr

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

Go looking for supply chain authority Dave Closs on the campus of Michigan State University and these days you may not find him on the premises of the school's Eli Broad College of Business. Instead, you might track him down in MSU's College of Veterinary Medicine or its College of Agriculture and Natural Resources.

That's not because the professor has acquired a particular interest in bovine health or soybean yields. It's simply that he has a more expansive view of supply chains than most—and he's actively examining supply chain factors in those fields and many others.

There are three very practical reasons for his breadth of involvement. One is that it sends an important signal to MSU business students—from undergraduate level to executive education—that supply chain themes are not only a matter for the world's industrial manufacturing and consumer packaged goods.

The second reason is that businesses and government agencies want collaborative solutions. Just as industry's customers are coming to them looking for broad solutions rather than off-the-shelf offerings, so industry is coming to universities. "We can't just say we don't deal with that field [because we're the business school]," says Closs. Currently he and his students are researching issues of security for the food supply chain under a grant from the U.S. Department of Homeland Security.

**Dave Closs seeks to forge a tighter bond between academics and practitioners.**

"I think we're in an interesting time in terms of academic leadership," says Closs. "This applies to schools of business in particular. We're all dealing with funding cuts, but at the same time, there's more demand for supply chain talent." He argues that this situation gives schools like his an opportunity to break with their traditional approaches to demonstrate how academics and supply chain practitioners can work more closely together.

The third reason for the professor's peripatetic behavior is this: Many of today's economic challenges span different fields of study. "Now we've got to open up. The problems are broader," he says.

## Education Innovator

Closs, who holds the John H. McConnell Chair in Business Administration at MSU, is a giant among supply chain educators. Ask business leaders to name the academics who have had the most influence on the profession in recent memory and his name will quickly come up. Over four decades, his teachings—in particular, his constant emphasis on practical trade-offs and on fact-based analytical decision-making—have benefited the careers of thousands of those practicing today in many supply chain-related fields. MSU is high on recruiters' lists of preferred sources of supply chain talent.

One of his proudest achievements is the school's highly concentrated Master of Science program in Supply Chain Management (MSSCM). The idea came out of requests voiced in the execu-

tive education programs. At the end of each year, Closs says, he would get requests for graduate studies in supply chain. At first, Closs and then-dean Don Bowersox considered online channels, but they soon decided that face-to-face interaction between participants was crucial to the success of such programs.

The outcome: A blend of four intensive 12-day in-residency sessions that make up the bulk of the course credits, together with online classes and a practical field study/research program that is usually related to a situation in the student's workplace. Dr. Closs explains that it's easier for participants to do 12 days at a time than to commit to a master's program that takes every weekend for two years. Confirms participant Don Beverlin, the vice president of supply management for Cessna Aircraft: "It allows me to continue doing my present job while gaining this valuable education."

Closs adds that the program enables its graduates to "stamp their passport" in that they have a much more nuanced sense of the trade-offs they need to make to do their jobs well. "Participants feel when they leave here that they're much more confident regarding their supply chain expertise," Closs says.

In the case of one MSSCM student—the supply chain chief of a medical products company—the course gave him the insights and confidence to save his company from significant problems. Not long after he had completed the MSU program, his company was acquired by a European firm that chose to invest in operations software. Closs's rigorous teachings and simulation exercises had given the executive the insights to quickly evaluate the effectiveness of the intended software solution—and he found it wanting.

In such situations, many managers would voice concerns to the new bosses and then stomach the consequences. But this executive had gained enough confidence from his MSSCM work to push for better solutions. He built a strong case to show the new owners that their calculations about the software were incorrect, and then worked with them for several months to devise a superior solution.

## Real-world Orientation

Dave Closs is very much the pragmatist. Constantly emphasizing real-world issues rather than academic theory, he regularly uses the term "trade-offs" in his discourse. In fact, it is a thread that runs through all of his teachings. He firmly believes that the best supply chain leaders are skilled at understanding and operating cross-functionally. "It's more than just knowing what the other supply chain functions are," he says. "It's about having some credibility with them—having some experience of being in purchasing, being in production. Somehow you've got to build some of those experiences into your career trajectory." And per his own experiences with the sister colleges at MSU, he sees the true supply chain exemplars reaching out across disciplines beyond their own—to finance, manufacturing, design, and even customer service.

**"Participants feel when they leave here that they're much more confident regarding their supply chain expertise."**

At the same time, he argues that supply chain leaders must be well grounded in the role of information technology. He should know: As a student and then colleague of the legendary Professor Don Bowersox, Closs took up his mentor's computer simulation exercises and developed them further as teaching tools. "I've spent my whole career dealing with technology. I grew up using software and analytics tools to train people and develop simulations," he says. "I know what technology can do but also what it can't do. Too many people assume that technology solutions are going to solve all the problems."

Dr. Closs has been extensively involved in the development and application of computer models and information systems for logistics operations and planning. The models have included applications for location analysis, inventory management, forecasting and routing. The information systems development focuses on inventory management, forecasting and transportation applications. His logistics students regularly use computer-based decision models and simulation tools.

One of the most exciting technology-based activities that he's involved with is the MSU Graduate Supply Chain Challenge. Unlike traditional MBA case competitions, this event has introduced a simulated real-time competitive supply chain strategy environment (the Supply Chain Operations Decision Environment, or SCODE) that objectively assesses the skills of each team to design and manage dynamic supply chains against a common scenario.

Closs also runs the IBM On-Demand Supply Chain Center under a grant from the company. Broad School graduate students and faculty use the laboratory to study, simulate and test the key relationships in an end-to-end supply chain, focusing on the dynamic flow of information and the resulting interdependencies between them.

But Closs being Closs, it's reasonable to expect that students, faculty, and supply chain practitioners far beyond MSU's Broad School will one day benefit from what he's studying in the IBM lab now.

**Supply chain management (SCM) promises to become even more challenging in the months and years ahead. How are professionals in this field coping with the stresses of performing in a tough economy? And what do they see as the keys to success for the future? For the answers, the authors went to the front lines—the logistics and supply chain managers who do the job every day.**

**By Patricia J. Daugherty, Scott J. Grawe and John A. Caltagirone**

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What's ahead for supply chain professionals? What are the challenges and opportunities that will confront them in the next few years? To answer these questions, we interviewed a select group of supply chain and logistics executives. We wanted to know their opinions on the current business climate and their expectations for the future. The accompanying sidebar to this article describes the research design and provides details about the participants. While we realize that generalizations should be made with caution, the participants represent a broad range of businesses in a variety of industries and perform a range of job assignments. They also collectively represent a considerable number of years of experience directly relating to the

# A REAL-WORLD LOOK AT SCM

impact areas we wanted to study. Approximately one-half hold positions of senior managers or directors with the balance at the vice president level or higher. They know what they are talking about!

Two general themes were voiced consistently in the interviews. First, there seemed to be an overall feeling of uncertainty as to what will happen next. The managers we interviewed realize they can't just take a "wait and see" approach, but they were somewhat hesitant about making big changes. It's not so much that they were negative; rather, they were unsure. Second, and not unexpectedly, the economy represented a major concern. Recent economic conditions have influenced everything from pulling back on collaborations with trading partners to re-thinking sourcing decisions and general resource allocations. In many instances, proposed initiatives haven't received the necessary support internally. Therefore, the survey participants said, many of their companies have resorted to "band-aid" approaches to problem solving as opposed to really fixing things.

The interviews were organized around three specific high profile, high impact areas: technology, talent, and sourcing. The three areas were identified as high priority during earlier discussions with supply chain leaders. Although there's overlap and connections among the three areas, each will be discussed separately.

## Technology: Cautious Enthusiasm

Respondents uniformly considered technology to be a high visibility/high priority regardless of their type of business or industry. All are focused on trying to figure out what's going to happen next in this space. At the same time, they are definitely proceeding with caution on their technology plans. One tough question they are wrestling with is, What's the next big technological breakthrough that's worth our investment and commitment in such uncertain times? The sense among our respondents seemed to be that we're at a point of inflection . . . but which why is the curve going?

Many of the companies represented have, in fact, introduced new technologies in recent years. Their current emphasis, however, is not just about introducing the next step in RFID or WMS (warehouse management systems). Instead, they are making commitments—or at least planning commitments—to technology that coordinates and integrates the supply chain processes. They are striving for integration across the entire supply chain—what was referred to as "one global platform." As one supply chain manager told us, "We are slaves to technology. We are still looking for the elusive 'translator' that communicates between all programs." In the meantime, the companies are focusing on integrating segments. Visibility and responsiveness also are priorities.

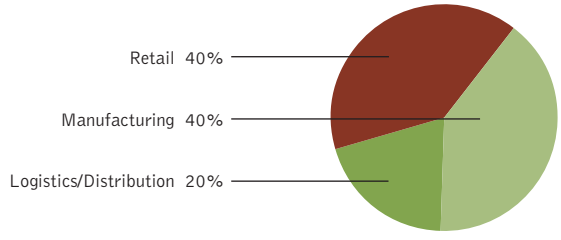
When asked about specific areas of projected technology spending, many of the respondents pointed to streamlining communications, increasing flexibility, and generally accelerating information flow. To cite a few examples, they want truck drivers to be able to directly interface with shippers and receivers; they want to be able to provide automatic service alerts for customers similar to shipment tracking notices; and those operating globally want to automate the customs process including advance customs clearance. Many respondents also cited the need for greater flexibility in their operations, and wanted to know how technology will make it happen. As a leading retailer we interviewed noted, "We are rolling out new systems in our warehouses. We also have a new demand planning system and we need a new TMS (transportation management system). These tools will give us much needed flexibility. We can put processes in place to improve our flexibility, but right now we just don't have the tools to make it work."

Security-related technology is another important issue for the companies. Security, of course, is a critical issue with international shipments. Several of the firms mentioned an increased emphasis on the security of those shipments and effectively dealing with customs mandates. As customs requirements are expected to be more

rigorously enforced in the future, companies are taking steps to insure that they will be in compliance. The retailers we talked to also expressed concern about dealing with consumer protection laws. They noted that the U.S. government has become more involved in enforcing consumer protection laws in the wake of problems with imported products such as the toys from China with lead-based paint. Retailer preparedness also extends to developing a proactive game plan for handling recalls when necessary. The respondents are looking to technology to help make their supply chains more secure and compliant with regulations.

EXHIBIT 1

**Respondent Industry Type**




The companies also are looking for more tools to increase supply chain efficiency. Among the most popular solutions in place are S&OP (sales and operations planning), ERP, demand planning, pricing, and WMS. Others mentioned included transportation-related technologies such as on-board computers and logs to help make drivers more efficient. Commenting on technology with a current and future potential for improving efficiency, one of the respondents at a transportation company commented: "Internal scales will have a nice impact in terms of efficiency. These scales allow trucks to bypass the roadside scales. Also, trailer tracking technology has been around, but the price is coming down and we are starting to see more of it in use. This technology allows us to see how full the trailers are, assess their utilization, and identify where seals are broken."

Notably, technology involvement extends to non-traditional areas. A prominent retailer in our study group talked about how social networking (such as facebook, twitter, and blogs) is affecting the business. "We need to move faster because we are getting feedback immediately from our customers," this supply chain manager said. "All of this is happening very quickly and impacting the supply chain from sourcing to manufacturing to transportation. Social networking is driving customer behavior and making my organization (SCM) become more reactive. The cycle time is happening a lot faster."

In spite of the differences in type of business and industries represented, we noted that where technology usage and "wish lists" were concerned, the responding companies are more alike than different. As one of the interviewees noted, "All of our customers are facing the same challenges and looking at similar solutions." There's a common need for technology support. However, the capabilities for meeting that need differ from company to company. Many of the respondents think they are doing a good job, reflected by comments such as "We're on top of everything." Others, however, admit that when it comes to supply chain technology implementation and support, they have a lot of catching up to do.

## Talent: Generalists Wanted

In recent years, there's been a significant shortage of qualified logistics and supply chain people. While the problem has moderated lately with the economic downturn, it hasn't gone away. We wanted to find out more about projected hiring needs and what skills are most in demand.

When asked if hiring has been a challenge recently, many of the supply chain managers answered yes. When some of the companies had difficulty hiring experienced applicants, they were forced to take on less experienced individuals and rely upon on-the-job training to get the new hires up to speed. Another frequently mentioned concern was the lack of generalists with solid and broad-based skill sets. Candidates with a narrow functional background, by contrast, were relatively plentiful. One respondent confirmed that the biggest weakness among the existing new-hire pool is that they are too specialized. What his company really needed, he said, were candidates with more broadly applicable business acumen. Consistent with this, another respondent talked about finding people who could execute basic distribution tasks, or what he called "floor generals."

A number of respondents, however, asserted that the need for true logistics specialists remained strong in many cases. As an executive at a logistics service provider explained, "Shippers have been dismantling their transportation departments and have come to lean on carriers and 3PLs…these firms need to get experts back in house."

Access to potential employees with the right profile will likely continue to be problematic over the next few years because of the challenges mentioned above coupled with the retirements of Baby Boomers. As one respondent noted, "The Baby Boomer succession plan is critical to our industry (trucking). The retirements are

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going to hit us and we need to have people get ready to step in."

Others say they haven't experienced problems in hiring because they have developed regular channels for bringing qualified people on board. Some hire from their supplier and service partners—for example, "We hire from our forwarding community." This gives them the advantage of hiring people who already know about their business while avoiding the time and expense of extensive training. Many of the companies have established strong linkages with colleges and universities to help recruit new graduates.

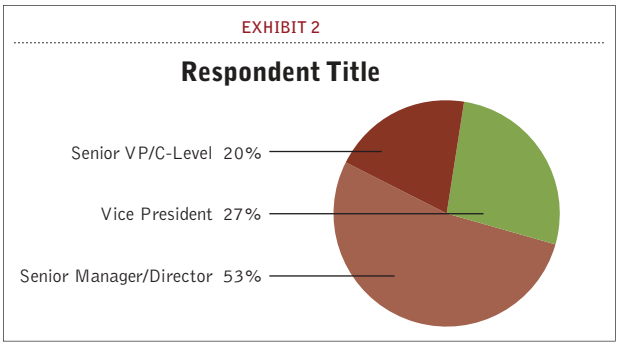
## Five Years from Now?

When asked to project areas of need five years out, many respondents mentioned purchasing- and sourcing-related capabilities. Global sourcing and vendor compliance, in particular, are hot issues. And it's clear that individuals trained in these areas will have good prospects. The companies we spoke with also want to ratchet up the qualifications and abilities of new hires. Specifically, they want people who can perform true "strategic sourcing" not just buying as usual. International knowledge—from logistics to compliance—is expected to be another competency in high demand.

What other skills are these potential employers looking for? At the entry level, they stressed the importance of a positive attitude. They are looking for people with a good work ethic, who are reliable, and prepared to learn and invest time in building their careers. That may seem like a standard profile for any job seeker…and maybe it was a few years ago. But today's new hires are not just a new generation, they're a different breed altogether as many employers are finding out. Several of the interviewees noted that the Gen Y mentality is that the company "owes them" something. They want to move up quickly, and if that does not happen or if something else looks better on the outside, they will have no hesitancy jumping ship. Management and motivation for this new breed of employee thus become critical. (We offer suggestions for dealing with generational-related issues later.)

Even when hiring new college grads, the companies want at least some work experience. Time-honored ways of gaining this experience are through summer jobs or internships. Internships are particularly popular right now because they give employers an opportunity to screen for potential full-time hires. "We build our own employees this way," one manager told us. Project experience is desirable, too. Many college grads gain this through "experiential learning" in which their graduate or undergraduate classes require a real-life project and interaction with the business community.

EXHIBIT 2




Other skills and abilities mentioned with respect to entry-level hires are similar to those you would expect for mid-level and higher positions. These include adaptability, prioritization skills, and technological competence. Regarding prioritization, one survey participant noted, "The employees can't do everything, they can't keep up at all times. So they need to be able to figure out what to do first."

Asked about requirements for mid-level hires, respondents often mentioned job-specific experience (work in the transportation or 3PL industry, for example). Someone with a proven track record of effective interfacing, problem solving, and communication—especially if it is in the hiring company's industry—is highly desirable. Another interviewee noted that while experience is important, personality traits are the crucial thing. Elaborating on this assertion, the manager said that she looked for people who "can make things happen." Persistence is a prized trait, too. This manager wants individuals who "have the ability to 'dog' people—and not give up until they get what they need." At the mid-level, our respondents looked for leadership skills and the ability to build relationships, both internally and externally.

## Sourcing: Still Mainly Tactical

The third impact area we investigated was sourcing and vendor relationships. As we mentioned earlier, the general perception is that strategic sourcing has become a commonplace practice in companies. In fact, the conventional wisdom seems to be that yes, strategic sourcing is the norm today. Our survey findings tell us, however, that this may not be the case. Some companies have never made the shift from transactional to strategic sourcing; others that had made the shift are reverting back to the old ways because of recent economic conditions. Put another way, their emphasis is on short-term survival.

Over and over again we heard that respondents' current sourcing operations are transaction focused—even among those companies that have been trying to build strategic sourcing relationship. One retailer told us, "We don't take time to have dinner with carriers or vendors or to play golf because it will only mean more work later as we make-up the time 'wasted' on the course. Firms are becoming more transactional for efficiency reasons." The following comments from the logistics and supply chain managers interviewed underscore the point.

- *We tend to be more transactional in nature. We're trying to move toward strategic relationships.*
- *We do strategic sourcing, but our whole thrust is cheapest cost. We're under tremendous pressure to get the lowest cost—we leverage purchasing power across all of our companies.*
- *We have failed in treating key vendors as "partners." We've been too cost-driven. Our current initiative is to be more collaborative and less about price-price-price.*
- *We've begun the process, but for now most focus is on cost reduction.*

Several of the companies are trying to identify long-term providers and work more closely with them. Others mentioned "partnering" and working with vendors to reduce complexity and gain efficiencies. An interviewee at a leading manufacturing firm detailed his company's biggest change with respect to sourcing practices. The company used 600 carriers in 2001 when this individual arrived. He immediately decreased that to 480 and now uses just 167 carriers. The company today is "very carrier friendly," he noted, and it is able to work more strategically with the smaller group.

Finally, one manager we interviewed offered a comprehensive picture of the company's strategic sourcing practices. These include partnering with component suppliers on technological solutions, taking advantage of preferred pricing and delivery terms, sourcing components and material closer to the manufacturing sites, implementing a component-complexity reduction project in order to leverage spend and commonality, and using Total Lowest Landed Cost (TLLC) to determine where products should be built. In addition, the company's supply chain group closely coordinates with its quality team to ensure that low price does not translate to low quality.

Looking ahead, respondents said that over the next three to five years, they will be working to reduce uncertainty in the supply base. To accomplish this, they plan a number of actions. These include: more closely assessing the long-term viability of business partners; formally certifying suppliers; and rationalizing the supply base by minimizing the number of partners and locations where products are built. Reflecting this strongly voiced desire for assuring supplier continuity, one interviewee made this comment: "Financials are important. We didn't ask for earnings statements in the past, but we do now." This same person characterized his company's sourcing practices as a "healthy mix of both strategic and transactional sourcing."

Environmental policies are likely to take on elevated importance going forward as more companies embrace sustainability as an ongoing commitment. Yet as one manager noted, when push comes to shove, cost is still the key and will override "green" concerns. Desires to reduce costs have also resulted in more use of private label products and shifts in sourcing locations. Based on what we learned in the interviews, it is unlikely that the trend towards more private label products will be reversed in the immediate future. Also, the companies are putting processes in place through which they can routinely evaluate sourcing locations and make changes as more attractive options are identified.

Some companies are considering more localized sourcing because of the complexities involved in moving product over long distances, coupled with the related risks and costs. No clear trend emerged with regard to global vs. local sourcing. Some respondents said they will focus less on Asia-Pacific and start looking to South America, Mexico, and even the domestic U.S. market for sourcing options. Others will concentrate expansion into China and Southeast Asia including emerging markets such as Vietnam. As one study participant noted, "Our manufacturing has shifted back to Mexico based on cost concerns. But we still feel (longer term) Asia is a better overall solution."

## What Have We Learned?

Following is a summary of what we think the interviews have told us—and our reaction to those messages.

***1.Cost is the primary driver.***

To a degree, that's always the case. However, our findings are certainly reflective of the current national and global economy. The business executives' responses were understandably influenced by the dismal economy. The situation will improve in time, but cost is always going to be a primary influence on business decisions—and at least temporarily, cost is having a tremendous impact. Reflecting the general mood, one survey participant asserted, "I don't really want to collaborate!" We think that she was really saying, "I don't have to collaborate."

However, times will change; collaboration and the "buddy system" are not gone for good.

***2. New employees have great expectations… too great?***

Even those companies that indicated few if any problems in finding new hires said they have encountered problems subsequent to hiring. As discussed earlier, this may reflect generational differences. New graduates and people in the early stages in their career often go through a job hopping phase. "We train them and they leave," one manager noted. "They become frustrated if they don't move up fast." Too often the expectations of the young hires are inconsistent with company policies and traditional career paths. It's tempting to say that the newcomers have unrealistic expectations. But that may just be our bias. Regardless, supply chain managers will have to deal with it.

***3. Our management styles may be outdated.***

We not only need more flexibility in our operations (see Item 5 below), but also in the way in which we manage our people. As one supply chain executive we interviewed said, "We don't seem to have the ability to communicate with the younger generation. They (the younger workers) don't have the same work ethic. So we are asking ourselves how we can be more flexible. For example, we're experimenting with flexible hours to keep them satisfied and motivated."

More emphasis needs to be placed on employee retention. Old leadership styles may not be the best for today's environment and workforce. Technologies have a lifespan. The same may be true for management styles and organizational structuring.

***4. Does our profession need an image makeover?***

While those of us who have worked for years in logistics and supply chain-related jobs think it's a great career, we would probably not characterize it as glamorous. How do prospective employers counteract this perception and succeed in attracting and keeping professional, polished people? A big part of the answer may relate to internal changes that make the jobs more desirable and more rewarding for talented young people.

***5. Flexibility and responsiveness are critical capabilities.***

Companies will always have to deal with the economy, product innovations and market demand shifts, technological breakthroughs, and generally unstable environments. How quickly and effectively they respond is the key to meeting these challenges and opportunities. As noted by a retailer interviewed, "We have to count on volatility. We don't like it, but fuel and volumes will always be volatile. We will also see wide swings for both and we need to embrace it and handle it more effectively." Operational flexibility and will remain high priority; however, flexibility and responsiveness must extend throughout the organization. Every aspect of the business—from operations to hiring practices to management styles—must be regularly assessed for possible changes, updates, or even elimination.

***6. The C-level knows we're here.***

When we asked about C-level (CEO, CFO, COO, CIO) involvement with the logistics and supply chain operations, almost everyone characterized it as very involved. Only one person indicated otherwise, stating, "Very little involvement. Zero percent input into our operations." The more typical comments were, "Supply chain is a premier initiative in the company" and "Our president is in our meetings every morning at 8 A.M." One of the managers interviewed noted, "All C-level folks, if not involved, are very aware of supply chain issues. They know that there have been incredible efficiencies involved (relating to supply chain-related changes)."

Most of the interviewees indicated that the top logistics or supply chain executive reports directly to the CEO; some indicated their top person has a seat on the company's executive committee. Further, one executive said that his firm places so much importance on supply chain management that it has given him the title of EVP and Chief Executive Officer. Another respondent noted: "We place much greater emphasis on supply chain management today. SCM can drive cash, be a competitive advantage, and generate excellent service and quality." Another said, "Even though the C-level people are not involved in the details, we definitely have a high level of visibility." We consistently heard that SCM will be the deciding factor in giving an organization a competitive advantage.

## How to Build a Great Supply Chain Team

As evidenced by their thoughtful comments, the executives we interviewed are very much focused on developing internal competencies that will allow them to successfully compete in the years ahead. If an organization doesn't have a top-rate team of supply chain professionals, they can't expect to survive much less succeed. We re-examined the interview material in order to develop a composite profile of what companies are looking for in their hiring process. HR people often use the "KSAB"

framework to help select employees with the right competencies—defined as those competencies considered predictive of successful long-term job performance. KSAB stands for Knowledge, Skills and Abilities, and Behaviors. Knowledge-related competencies refer to a practical or theoretical understanding of subjects. Skill and ability competencies relate to natural or learned capacities to perform. Behavioral competencies involve patterns of action or conduct. Each will be discussed separately.

## Knowledge Competencies

Logistics and supply chain-specific knowledge as well as general business knowledge are the minimum requirement for getting a job in this field. At the entry-level, today more companies seek people with supply chain (or similar) degrees. While more universities now offer logistics and supply chain majors than ever before, the supply of graduates doesn't seem to be keeping pace with the demand. Efforts are needed to attract more students to these majors.

Moving beyond entry-level jobs, companies look for a combination of education and job experience. The greatest emphasis is usually placed on experience and previous responsibility level as people move up. Also, more and more, graduate-level degrees are seen as a prerequisite to advancing in an organization.

## Skills and Abilities

While a range of needed skills and abilities were mentioned by the study participants, a few emerged as top priorities. These included interpersonal skills, problem-solving skills, and communication skills. Interpersonal skills—the capability to build internal and external relationships—are high on the wish list. Job candidates with a fresh perspective and a success-orientation are often selected because of the expectation that they will be good problem solvers. As one manager for a logistics services provider noted, the best employees "do problem solving, planning, and they look for ways to improve operational efficiency not just for us, but for the shipper, too." Articulate individuals with good verbal and written communication skills are highly prized.

## Behavior

One interviewee told us that "willingness to learn is the key." This really comes down to attitude. People must want to learn and then apply that learning in ways that are meaningful for the organization. The most highly desirable behaviors cited are perseverance, commitment, and leadership. Work ethic and discipline are considered essential manifestations of these traits. One sturdy participant pointed to problems encountered with "employees who expect to sit down and do something easily and quickly—and give up if it doesn't happen." This individual and others underscored the importance of perseverance. These managers want people who are willing to concentrate and work at finding solutions to problems. Another noted the importance of avoiding hiring people who "melt" when the going gets tough. Bottom line, companies are really looking for a catalyst. In a supply chain context, that is someone who makes things happen and can lead others.

Our study was not intended to chronicle every single challenge facing supply chain and logistics professionals in 2010. Nor was it a scientific attempt to predict the supply chain future. Rather the objective of our research was to give a real-world look into what's on the minds of working supply chain and logistics professionals today—and what they view as the key elements to a successful future. We hope that their insights and information will help you in your supply chain activities, both now and in the years to come.

## About the Research

The study team conducted personal interviews with logistics and supply chain leaders regarding the current and future state of the industry. Executives from 15 firms offered their insights in telephone interviews that ranged from 30 minutes to two hours in length. The participants hold senior-level positions at retailers, manufacturers, distributers, and logistics service providers. They represented a variety of organizations from medium-sized private firms to Fortune 100 corporations. (Exhibit 1 on page 14 shows types of industries; exhibit 2, page 16, gives title breakout.) The executives discussed trends related to sourcing, technology, talent, and other issues impacting their supply chains.

**Authors' Note:** We would like to thank each of the executives who helped us with the research. Their insights added greatly to our project. The University of Oklahoma Logistics/Supply Chain Executive Panel periodically conducts short surveys. If you are interested in joining the panel, please contact Pat Daugherty at pdaugher@ou.edu or 405-325-5899.

# A Portfolio Approach to

**In today's volatile economy, one supply chain design is probably not enough. What's really needed is a portfolio of supply chains that at once enables you to be cost effective and yet agile and highly responsive in situations where those competencies are called for. The case study here on HP's Inkjet Printer Supply Chain spotlights a successful portfolio approach in action.**

**By Thomas Olavson, Hau Lee and Gavin DeNyse**

Our supply chains operate in a volatile world. Starting in 2007, oil prices climbed from $60 to $145 per barrel within 18 months only to crash back to $40 shortly after the peak. As a result, fuel surcharges for airfreight went on a rollercoaster ride up to as high as 50 percent of the base rate and back down to close to zero within a two year period. In a six-month period starting in late 2008, the Chinese Yuan strengthened in value against the Mexican peso by more than 50 percent, only to fall back close to its original value within a year of the peak. When considering alternatives like manufacturing a product in Mexico vs. air shipping it from China to North America, shifts in macroeconomic factors can mean the difference between winning and losing in the marketplace.

In such a volatile environment, it is unwise to use a one-size-fits-all approach to supply chain design. While offshoring or nearshoring manufacturing, building in as much speed in to your supply chain as possible, and postponement all have their place, they are not universal best practices. To illustrate, while the Hewlett-Packard case study on postponement continues to be taught in many business schools, HP actually has discontinued the use of postponement for many of its printer platforms. HP has adapted its supply chain to the realities of a maturing product category.

Clearly, supply chains need to be adaptable to cope with changing environments defined by economic factors likes oil prices, exchange rates, labor rates and tax policies; competitive forces; and the maturity of product categories as product characteristics and business strategies evolve. In describing "The Triple-A Supply Chain," Hau Lee stressed the importance of alignment, agility, and adaptability for world-class supply chain performance.[1] Agile supply chains respond quickly to short-term changes in supply and demand. Adaptable supply chains adjust supply chain design to accommodate market changes. Aligned supply chains establish incentives for supply chain partners to improve performance of the entire chain.

But how often should a business adapt its supply chain design and ramp up an entirely new supply chain? How do we know which new design will be best? Does agility mean that the supply chain should serve all cus-

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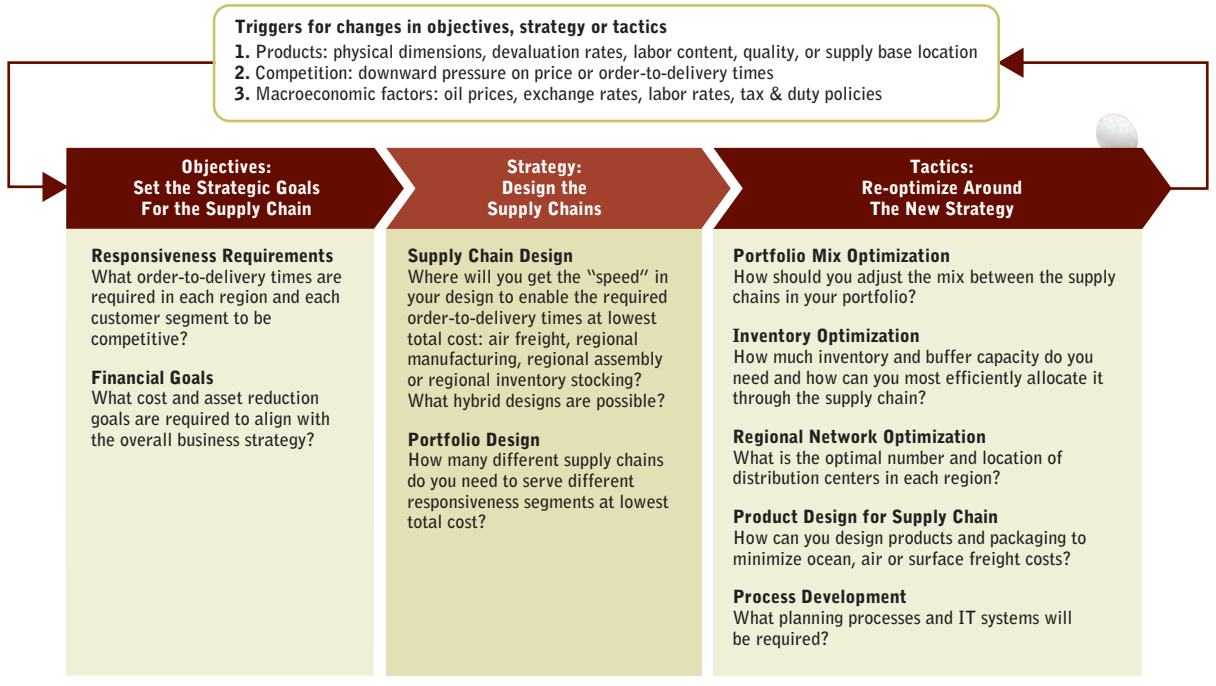
# Supply Chain DESIGN

EXHIBIT 1

**A Framework for Supply Chain Design**




tomer segments with a highly responsive, short order-to-delivery model? Is there still some way to capture benefits of lower cost, more efficient supply chain designs?

In this article, we demonstrate how companies can respond to these challenges through the use of *portfolios* of supply chains. Portfolios allow companies to reap the benefits of low cost, lean supply chains while still remaining agile and responsive where they need to be. Portfolios also allow supply chains to adapt over both the long-term and short-term, with or without changing supply chain designs. In the short-term, portfolios allow companies to re-optimize tactics to shift the mix between supply chains to adjust to macroeconomic volatility and new competitive threats to both price and responsiveness. In the long-term, portfolios allow companies to gradually phase in and out supply chain designs to adapt to long-term market trends, business strategy shifts, and maturing product categories. Not all companies will have the scale to afford to have multiple supply chains for the same product category. But for companies like HP that have scale, operate globally, and serve customers through a variety of sales channels, they can gain significant competitive advantage through the use of supply chain portfolios.

At its heart, supply chain design involves tradeoffs between cost and customer responsiveness. Just as a stock portfolio will have more efficient overall tradeoffs between risk and return by diversifying across multiple asset classes, supply chains will have more efficient overall tradeoffs between cost and responsiveness by having multiple supply chains.

## A Framework for Supply Chain Portfolios

Exhibit 1 shows a framework for designing and managing supply chain portfolios. There is a sequence and hierarchy at work here. Strategic objectives are at the top of the hierarchy and are typically either set by top management or dictated by the marketplace. Strategic objectives align supply chain strategy with business strategy and the realities of the competitive environment. Once those goals are understood, supply chain strategists can design an appropriate portfolio of supply chains to meet the required responsiveness levels for various customer segments at minimal total cost.

A small number of top-notch analytical strategists, often as part of a centralized supply chain strategy and modeling team, are needed to periodically re-visit questions of supply chain design. Once supply chains are set, tactics can be optimized. Tactics are re-optimized more

**The best design will vary depending on product characteristics** like inventory devaluation rate, labor content, and physical weight and bulkiness.

frequently than supply chain design, and are at least as important as strategy in achieving the best possible trade-off between responsiveness and cost. For instance, as part of optimizing the mix between supply chains, during each lifecycle products need to be mapped to an appropriate supply chain within the portfolio. Re-optimizing tactics will involve many more people each doing their part from across functional, business unit, and regional supply chain organizations.

## Case Study: HP's Inkjet Printer Supply Chain

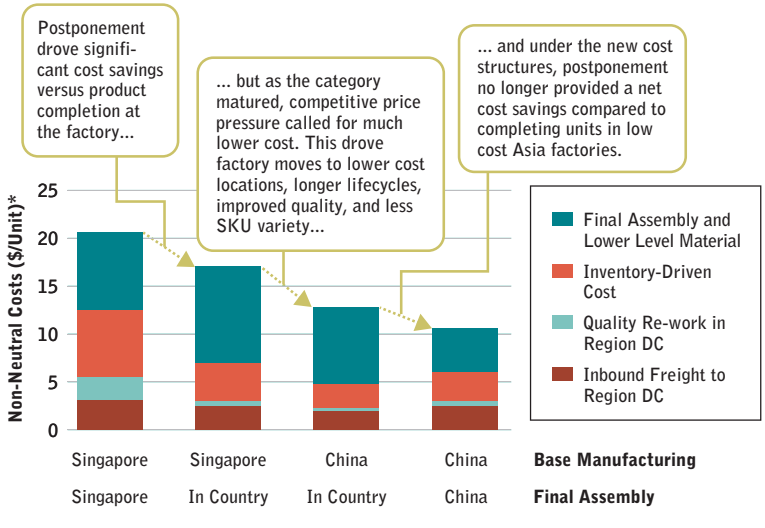
The evolution of HP's inkjet printer supply chain exemplifies the importance of adapting supply chain design over time, and demonstrates how supply chain portfolios can allow that adaptation to occur in a seamless manner.

The inkjet printer story is an example of adaptable supply chain strategy based on changing customer requirements, product characteristics, and most importantly financial goals set at the executive board level. In the 1990s in its printer business, HP pioneered the use in the high tech industry of a supply chain design with late point differentiation, or "postponement". In postponement, the task of differentiating a product for a specific customer segment is postponed until the latest possible point in a supply network. Through modular product design and manufacturing processes, printer "engines" can be manufactured in low cost factories in Asia, while the final assembly and packaging of those engines into differentiated SKUs can be done in regional postponement centers that are closer to the true customer demand. For example, a German and a French SKU may be built from a common printer engine that is held in inventory until close to the time of a customer order when the actual demand mix between the SKUs is known. HP saved hundreds of millions of dollars over the years by using postponement to deliver customized products quickly and at a low cost. However, in recent years HP has largely shifted away from postponement to minimize the regional manufacturing and distribution costs in the supply chain.

Exhibit 2 illustrates the value of the original postponement strategy and the subsequent shift from final assembly out of the region and into the worldwide factory. The stacked bars represent the costs of alternative designs. The bars focus only on the relevant costs that drive *incremental* differences between alternatives in the decision. We call these the "*non-neutral*" costs. For the sake of simplicity in the case in Exhibit 2, we exclude the base unit manufacturing cost and the outbound surface freight cost, since all these supply chains relied on low cost manufacturing in Asia and fulfilled orders from a network of distribution centers in each region. The non-neutral costs are those from final assembly (in the factory or in the region), the international freight cost (bulk engine or finished unit shipped by ocean), quality and rework costs in the region (more costly without regional postponement centers to handle quality or NPI problems), and inventory-driven costs.

EXHIBIT 2

**The Shift Away from Postponement**




* Data is illustrative only for a low-end inkjet printer.

When comparing alternatives on cost, all alternatives should include the same assumption for customer order-to-delivery time and service level. We have done so here. The postponement alternative will require lower inventory safety stocks, since SKU level forecast error can be risk-pooled and filled from base unit engine inventory in the regional product completion centers. Inventory-driven costs include not only the more tangible costs of financing and warehousing, but also the less predictable and less tangible costs of devaluation, excess and obsolescence, channel price protection or price markdowns due to excess.[2]

In the inkjet story depicted in Exhibit 2, we show the effectiveness of two alternatives in the mid-1990s and ten years later. During this time, the printer product has matured, resulting in five key customer and product differences that alter the cost structure:

1. Inventory-driven cost rates are lower, since devaluation rates are lower, lifecycles are longer, and the customer demand and market size are more predictable.

2. Fewer SKUs are needed in mature markets with more well defined and consolidated customer segments; therefore, the inventory risk-pooling benefits from postponement are reduced. The problem of forecasting the right mix of SKUs in the region at the China factory lead time is less severe.

3. Product quality is more stable, so the re-work costs are lower. The ability to re-work quality issues in the regions used to be a key advantage of the postponement design, especially during new product introduction for new technologies. Now, the regional re-work capabilities are seen as an enabler of poor build quality or NPI schedule slips that simply can't be tolerated in a mature product category while staying profitable.

**Companies will have more efficient overall tradeoffs** between cost and responsiveness by having multiple supply chains.

4. The printer has become smaller and is thus less costly to ship in finished goods form through international freight. A low-end inkjet printer today is about one-third the size of one from the 1990s, and packaging has been optimized to maximize the number of finished units that can fit into a pallet.

5. Manufacturing costs are much lower with low cost offshore manufacturing. HP's inkjet manufacturing operations started in the U.S. close to the R&D base in the 1980s, moved offshore to Singapore in the 1990s, and then migrated to China and other low cost Asia countries. With each step, the direct labor costs were cut by more than half. With the change in cost structure over time, doing product completion steps in high cost regional postponement centers in the U.S. or Europe became more expensive relative to doing product completion in low cost factories.

These product and customer differences impacting cost structure were also driven by shifting financial goals. The financial goals in a high-growth market where capturing market share is imperative are fundamentally different than in a mature market where profitability and free cash flow are the focus. The financial goals were the fundamental driver to initiate programs to offshore manufacturing, improve quality, reduce SKUs, and reduce product and packaging size.

Consequently, more and more of the product lines shifted away from postponement to "low touch" models where factories supplied finished goods inventory to regional distribution centers. As with the postponement strategy that preceded it, the value of this new low touch

EXHIBIT 3

**HP's Portfolio Today: Two or More Supply Chains**

| | A Fast Supply Chain | A Low Cost Supply Chain |
|---|---|---|
| Inkjet Printers, Late 90's | **Postponement** Worldwide Manufacturing; In-Country Assembly; In-Country Order Fulfillment; Build-to-Stock | **Low Touch** Worldwide Manufacturing and Assembly; In-Country Order Fulfillment; Build-to-Stock |
| Inkjet Printers, Today | **Low Touch** Worldwide Manufacturing And Assembly; In-Country Order Fulfillment; Build-to-Stock | **International Direct Ship-Ocean** Worldwide Manufacturing, Assembly; Ocean Freight, Build-to-Customer Commit |
| Notebook PCs | **International Direct Ship-Air** Worldwide Manufacturing Assembly, and Order Fulfillment; Air Freight; Configure-to-Order | **Ocean** Worldwide Manufacturing and Assembly; Ocean Freight, Build-to-Customer Commit |
| Desktop PCs | **Regional Manufacturing** In-Region Manufacturing, Assembly and Fulfillment; Build-to-Order | **Worldwide Manufacturing** Worldwide Manufacturing, Assembly; Build-to-Customer Commit |

strategy is in the hundreds of millions of dollars order of magnitude. Still, postponement has its place in the high-end of HP's laserjet printer portfolio where product quality is less stable, variety required to compete in the marketplace is greater, and product availability to capture share in growing markets is still the top priority. The laserjet supply chain portfolio looks much like the inkjet supply chain portfolio five years ago, with a mix of postponement and low touch. But for inkjet printers, postponement has been phased out of the portfolio, replaced by the low touch model.

So what does the inkjet supply chain portfolio look like today? As shown in Exhibit 3, many of HP's business have a portfolio of at least two supply chains, with a relatively responsive supply chain and a supply chain optimized for cost. To respond to ever greater cost pressures, a new, even lower cost supply chain design has been added to the inkjet supply chain—"international direct ship-ocean."

## Strategic Objectives: Setting the Design Requirements

A starting point for designing supply chain portfolios is to understand the strategic objectives that the supply chain should serve. Broadly, the objectives are of two types: (1) customer responsiveness levels required to be competitive in different customer segments and sales channels, and (2) financial goals for cost, inventory and asset reduction required to serve the overall business strategy set at the top levels of the company.

### *Customer responsiveness requirements*

There is a continuum of tradeoffs between responsiveness and cost for a given product—and designing a supply chain for a single point on that continuum would likely leave the business uncompetitive on delivery time in some channels and uncompetitive on cost in other channels. For example, enterprise customers who prefer ordering from a manufacturer directly may require greater responsiveness than retail or distribution partners who engage with the manufacturer on collaborative forecasting and planning processes. Responsiveness requirements should start with the customer and competitive landscape in mind. More than one supply chain will often be needed in global businesses with diverse product categories, channels, customer segments and fierce competitive pressure.

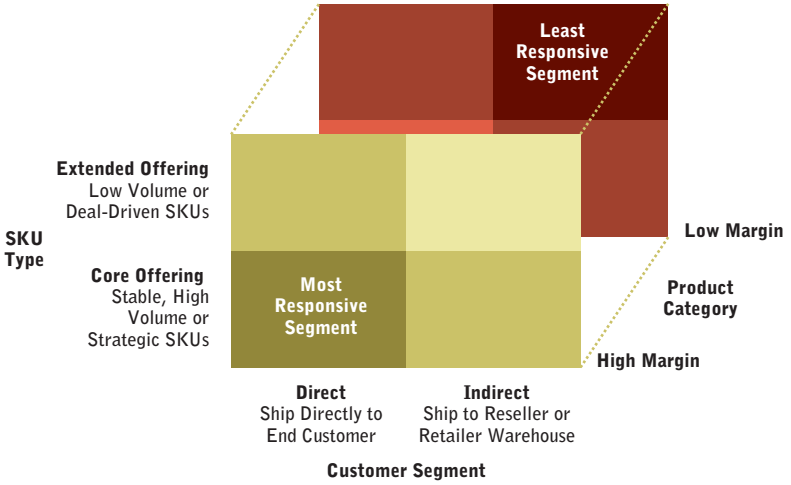
Segmenting customer demand into different OTD time requirements allows supply chain designers to match the distribution of delivery time requirements with a portfolio of supply chains optimized for cost at each responsiveness level. This enables competitive delivery across a range of regions, channels and customer segments without overinvesting in speed in any one segment. Portfolios of supply chains geared towards low and high responsiveness segments also allow a business to adapt supply chains quickly when a competitor enters a channel and applies pressure on either price (favoring a low cost supply chain) or delivery time (favoring a fast supply chain).

Exhibit 4 provides a starting point for segmenting products and customers by responsiveness needs. Distinctions can be made both by product category and customer type. Serving channel partners does often not require the same level of responsiveness (short OTD) as serving enterprise customers directly. In many cases, the additional downstream inventory stocked in a channel partner's distribution center is another reason why responsiveness can be set lower (in exchange for lower cost) with channel customers.

The other dimension for segmenting responsiveness is product value, which can vary across high and low margin product categories or within a product category across different types of SKUs. High value products are those product categories with high gross margins where

EXHIBIT 4

**Responsiveness Requirements: Customer Segments, SKU Types and Product Margins**



stockouts are most costly, and therefore service levels and service times are more favorable to the customer. For example, in the printer business, different supply chain designs may be appropriate for the high margin ink supplies category (where the closest substitute product may be a non-HP product) vs. the lower margin printer hardware category (where a different HP printer may be an acceptable substitute to one that is out of stock). Within a product category, a business may further distinguish between higher value "core" SKUs and lower value "extended offering" SKUs. Enterprise customers and channel partners expect high volume "core" SKUs to be in stock with short delivery time. Yet they may be more willing to accept longer delivery times on SKUs that are less popular or have customized configurations that they may request over standard configurations.

### *Financial goals*

Financial goals also are driven by competitive factors. In growing markets where priorities are around capturing market share and growing revenue, financial goals may serve to reinforce customer responsiveness goals. They may also support the ability to quickly customize the product to a different version (postponement) in order to capture and identify new growing market trends. This tilts the supply chain design to favor responsiveness over cost, maximizing revenue growth. Especially in the early portion of the market creation, amortizing fixed costs over as much volume as possible can be critical, and a responsive supply chain can help. As product categories mature, pressure to reduce costs (supply chain cost as % of revenue) or working capital (days of inventory) becomes increasingly important. Mature markets will tend to have well understood customer profiles, so responding quickly to customer demand or product variation is less important than being cost competitive.

Based on where the product is in its lifecycle, the financial goals necessary to grow a business profitably (early in the lifecycle) or to ensure that a mature business stays profitable (late in the lifecycle) are different. Furthermore, mature businesses have the added pressure of needing to generate enough cash to feed investments in growth businesses.

## Supply Chain Design and Decision Quality

Key to executing the approach we have described is having a proven technique for the supply chain design process, a method for determining which designs are right for your business (the portfolio), and a project governance structure to ensure decision quality.

### *Supply chain design*

To frame a set of decisions and options used to construct strategies, we often use a technique from the practice of decision analysis called a strategy table. Exhibit 5 is a simple, generic strategy table for supply chain design where we have listed five fundamental strategic decision levers that are linked to form a supply chain design. Choices for each decision lever are linked to develop a supply chain design.

EXHIBIT 5

Strategy Table for SC Design
(One Option Chosen From Each Column)

| | Manufacturing Location | International Freight Mode | Final Assembly Location | Order Fulfillment Location | Inventory Stocking Model |
|---|---|---|---|---|---|
| Fast but High Cost Option | In Country (e.g., US) | Air | In Country | In Country Factory/DC | Build-to-Stock |
| Intermediate Option | In Region (e.g., Mexico) | Truck /Rail | In Region | In Region Factory/DC | Configure-to-Order |
| Slow and Low Cost Option | Worldwide (e.g., China) | Ocean | Worldwide | Worldwide Factory/DC | Build-to-Order/ Customer Commit |

Most customer order-to-delivery time requirements are shorter than what would result from choosing the absolute lowest cost supply chain. The design objective is to minimize the total supply chain cost subject to meeting the OTD requirement. The best design will vary depending on product characteristics like inventory devaluation rate, labor content, and physical weight and bulkiness. The key insights in supply chain design come from realizing *which* lever will provide the most cost-efficient source for speed. Speed can come from manufacturing close to the customer, shipping by air, or doing final assembly and/or inventory stocking close to the customer.

For example, consider the supply chain portfolios for inkjet printers, notebook PCs, and desktop PCs. Exhibit 3 summarizes a "fast" supply chain used in each business. They are all different, and each gets its "speed" from a different source. For printers, getting speed from manufacturing in the region or shipping by air would come at a high cost premium to shipping by ocean from Asia. So inventory safety stocks are used in customer

segments and SKU types where short OTD is required. For notebooks, inventory devaluation rates are high, so holding safety stocks of inventory in the region is not a good option. However, notebooks are relatively lightweight and compact, so shipping by air from Asia is attractive relative to manufacturing in the region close to the customer. Desktops, however, are bulkier than notebooks, tipping the balance towards regional manufacturing for customer segments and SKU types where higher responsiveness is required. Hybrid options may also be possible, where a more costly regional manufacturing or postponement supply chain is used only as a buffer to fill upside demand or used only at product introduction and end of life when forecast error and its costs are higher.

***Portfolio Design***

The number of supply chains that are right for a given business will depend on a number of factors: How widely do the customer requirements vary across segments? How great is the cost difference between the best supply chain for the shortest OTD segment and the best supply chain for the longest OTD segment? Is there a strategic shift underway to migrate towards a lower cost supply chain structure, where multiple supply chains will be needed during the transformation? Are there economic risks, like oil prices, exchange rates, or new competitors that could be effectively hedged with a second supply chain? What fixed costs are associated with maintaining multiple supply chains, and what is the breakeven volume where the variable cost benefits of adding a supply chain outweigh the fixed and investment costs?

To begin to understand these questions, we recommend using rough cut analysis to construct an "efficient frontier" of supply chains. The efficient frontier maps cost/unit as a function of the responsiveness requirement (OTD). For each OTD, estimate the cost of the supply chain that minimizes the cost to meet that OTD. There will likely be multiple designs represented on the efficient frontier—for example, for notebook PCs, points to the left of the curve would represent the air ship supply chain and points to the right of the curve would represent the ocean ship supply chain. Once we understand the magnitude of the cost differences as we move across the efficient frontier, and how the supply chain designs are materially different, then we are in a better position to decide how many supply chains should be included in the portfolio.

***Decision quality in supply chain design***

Perhaps the most important dimension of decision quality to emphasize is the importance of building commitment to action. This does not happen just by having a good strategy and a good analysis. Rather, it is a process of organizational change management that starts by involving up front all of the key stakeholders and decision makers and going through the analysis and design journey together. By collecting data inputs, issues and ideas from all affected groups throughout the process, trust and confidence is built as a foundation for building alignment and commitment to a decision. An essential element to building commitment to action is having a clear project governance structure. In such a structure, a core team who can be trusted with impartial analysis iterates back and forth with a steering team of decision makers representing all of the key stakeholders. Ideally, the core team is led by a neutral, data-driven, centralized team of analytic consultants, such as HP's Strategic Planning and Modeling team. At its heart, supply chain design is a strategic decision. Accordingly, it is just as important to include best practices from strategic decision-making as it is to include best practices from supply chain management.

Implementation of new supply chain designs should not be underestimated. New supply chains may be designed in a matter of months, but implementing, optimizing, and re-optimizing the supply chains takes years. The time and investment required to build a new supply chain emphasizes not only the importance of doing supply chain design well, but also the importance of designing portfolios of supply chains. Portfolios buy us time to implement long-term strategic shifts in our supply chains with minimal disruption, and they build in future options and flexibility for dealing with the unexpected. In short, portfolios enable us to meet diverse customer requirements at lowest cost, align to strategic shifts in business strategy, and deal with unexpected changes in the marketplace—all hallmarks of world-class supply chain performance.

**Authors' note:** We would like to acknowledge Barrett Crane (Supply Chain Strategist in HP's Imaging & Printing Group) and John Haller (HP's Strategic Planning and Modeling team) for their valuable contributions and feedback on this article. We also acknowledge the contributions of the many HP project teams who push forward our understanding of supply chain portfolios with every supply chain strategy project and program implementation completed.

**End Notes:**

1 H. Lee, "The Triple-A Supply Chain," *Harvard Business Review*, October 2004.

2 For more information, see Callioni et al., "Inventory-Driven Costs," *Harvard Business Review*, March 2005.

# MULTINATIONAL *for* Supply Chain Facilities

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The Obama administration, in its last two budgets, has proposed changes in the tax laws that would increase tax burdens on corporations that have operations in foreign jurisdictions. So far the U.S. business community has successfully resisted these proposals, but the pressure is certain to continue.[1] At the same time, business executives and policymakers believe that measures such as lower corporate tax rates are needed to make the United States more competitive in global markets. Thus, current and proposed taxation of international transactions plays an important role in where multinational organizations chose to locate their operations.

Although most supply chain managers have become increasingly familiar with the transportation and pipeline inventory costs that threaten the savings expected from overseas facilities, they are less comfortable with the tax issues that pertain to international transactions. Proper attention to these issues can potentially increase the profitability of multinational organizations.

The objective of this article is to give supply chain managers a basic understanding of the fundamental tax ramifications of international location decisions and to provide a framework for assessing proposed changes put forth by the Obama administration. The complex nature of the tax law precludes a detailed analysis in this article. Therefore, we have opted to focus on three of the most influential factors: the foreign tax credit, the potential deferral of U.S. taxation on foreign earnings, and transfer pricing between related entities in different tax jurisdictions.

## Foreign Tax Credit

The foreign tax credit (FTC) is a complex area of U.S. tax law and often is overlooked or misinterpreted by supply chain managers. The context for the credit is this: The U.S. government taxes foreign as well as U.S. income of multinationals in what is called a worldwide tax system. Foreign jurisdictions also tax

# TAX PLANNING

**Supply chain managers responsible for locating global operating facilities are familiar with the transportation and pipeline inventory costs that threaten expected savings in labor and production. But they are much less comfortable with the tax issues that affect decisions about facility location. This article sheds light on three of the most important: the foreign tax credit, tax deferral and transfer pricing.**

income earned within their borders, thereby potentially subjecting the same income to double taxation. To mitigate this problem, U.S. tax law allows a U.S. corporation to claim a credit for foreign taxes paid or incurred by a subsidiary or branch operating in another country.

However, the FTC is limited to the amount of U.S. tax attributable to foreign taxable income. Specifically, it equates to the ratio of foreign taxable income over worldwide taxable income, multiplied by the U.S. tax on worldwide taxable income. For example, let's assume that a company's worldwide taxable income is $1,000, with $400 of that amount earned in a foreign country. If a 35 percent U.S. tax rate applies to the $1,000, then the FTC limitation is ($400/$1,000) x $350, which equals $140.

When computing the FTC, a company must divide its foreign income into two baskets: passive category income (defined as dividend, interest, royalties, rents, annuities, and so forth) and general category income (income other than passive category income). A separate FTC limitation applies to each category.

If foreign taxes exceed the FTC limitation, the U.S. company can carry the excess foreign taxes back one year and forward 10 years, subject to the FTC limitation in the carryback or carryover year. This situation usually occurs if the applicable tax rate in the foreign jurisdiction exceeds the U.S. tax rate. If the FTC limitation exceeds the foreign taxes, the business has an excess FTC limitation that can offset carrybacks and carryovers into the year having the excess FTC limitation. This situation usually occurs when the U.S. tax rate exceeds the applicable tax rate in the foreign jurisdiction. Due to the mechanics of the FTC computation, however, the applicable tax rate in a foreign jurisdiction is not necessarily the current statutory tax rate but rather may be an average of multiple years' rates.[2]

In some cases, a company may offset excess foreign taxes in one or more countries against excess FTC limitations in other countries. This offsetting mechanism is called cross-crediting; it works for income falling within the same income basket. Thus, companies can apply cross-crediting if the taxes occur in various jurisdictions on income falling within the general category (for example, operating income). Companies also can apply cross-crediting to income of various jurisdictions falling within the passive category. However, they cannot cross-credit excess foreign taxes in one category against an excess FTC limitation in the other category. Clearly, the location of operations and the type of income can influence the degree to which multinationals can maximize the FTC.

The cross-crediting situation usually occurs when the applicable tax rate in one country is less than that in the United States, and the applicable tax rate in another country exceeds the U.S. tax rate. This situation can occur when the current foreign statutory tax rate is high or when the applicable tax rate results from averaging several years' rates, including years with high rates. In addition, the United States conceivably could lower corporate tax rates to make U.S. companies more competitive in global markets, particularly if the nation moves to a value-added tax (VAT).

Exhibit 1 illustrates basic FTC calculations, comparing a situation where cross-crediting does not apply with one where it does apply. The example assumes that a company operates in the United States and in two foreign countries, with $200,000 of worldwide income comprised of $120,000 from U.S. operations and $40,000 from operations in each foreign country. It further assumes the following applicable tax rates: U.S.=30 percent (e.g., after a rate reduction); Country 1=20 percent; and Country 2=40 percent.

In the no-cross-crediting case, income in Countries 1 and 2 derives from different baskets. Country 1's foreign tax is fully creditable because it is less than the FTC limitation for that country. But the FTC for Country 2

EXHIBIT 1

**Foreign Tax Credit Example**

| | With No Cross-Crediting | With Cross-Crediting |
|---|---|---|
| **Foreign Tax** | | |
| Country 1 ($40,000 X 20%) | $ 8,000 | $ 8,000 |
| Country 2 ($40,000 X 40%) | 16,000 | 16,000 |
| **Total** | **$ 24,000** | **$ 24,000** |
| **Net U.S. Tax** | | |
| Worldwide Taxable Income | $200,000 | $200,000 |
| U.S. Tax Rate | 30% | 30% |
| U.S. Tax Before FTC | $ 60,000 | $ 60,000 |
| Foreign Tax Credit | (20,000)[a] | (24,000)[b] |
| **Net U.S. Tax** | **$ 40,000** | **$ 36,000** |
| **Total Tax And ETR** | | |
| Foreign Tax | $ 24,000 | $ 24,000 |
| Net U.S. Tax | 40,000 | 36,000 |
| Total Tax | $ 64,000 | $ 64,000 |
| **Effective Tax Rate** | **32%[c]** | **30%** |

[a] FTC limitation for each country = $40,000/$200,000 x $60,000 = $12,000. Thus, the total FTC allowed is $20,000, with $8,000 pertaining to Country 1 and $12,000 pertaining to Country 2, thereby creating an excess limitation in Country 1 and an excess FTC in Country 2.

[b] Total FTC limitation = $80,000/$200,000 x $60,000 = $24,000.

[c] Assumes excess FTC carryover from Country 2 will not be used in the future.

is limited, leaving an excess FTC to carry back one year and carry over for 10 years. If the relative rate structure stays the same for the next decade, however, the company will never be able to use the excess FTC even though it has an excess (unused) FTC limitation pertaining to Country 1.

At the same time, if an FTC carryover is not used, it has a negative impact on the company's financial statements. Generally, the company records a deferred tax asset on its balance sheet to reflect the future benefit of the FTC carryover. However, if the probability of using the FTC carryover in the future is 50 percent or less, the company must record an offsetting valuation allowance, which increases its effective tax rate. In the no-cross-crediting side of Exhibit 1, that effective tax rate is 32 percent rather than 30 percent. This effective tax rate can be computed two ways: $64,000/$200,000 = 32 percent or 30 percent assumed statutory U.S. tax rate + 2 percent increase pertaining to the valuation allowance. The latter method often appears in a company's tax rate reconciliation footnote to the financial statements.

The cross-crediting side of Exhibit 1 assumes the same facts as the previous case except that the income derived in Country 1 and Country 2 falls into the same basket, thereby allowing cross-crediting. Here, the company combines foreign taxable income and worldwide taxable income to arrive at a single FTC limitation, effectively permitting the offset of Country 1's excess FTC limitation against Country 2's excess FTC. This approach reduces the company's total tax liability and its effective tax rate. If the company must locate operations in a high tax rate country, it would gain a tax advantage by also having some operations of the same category in a low tax rate country.

## Tax Deferral

Tax deferral represents another tool available to generate economic benefit from foreign location decisions. Organizations may be able to use subsidiaries for foreign operations to take advantage of U.S. tax deferrals on unrepatriated foreign earnings. The timing of when a U.S. company recognizes income earned in foreign jurisdictions depends on the type of related entity earning the income and on the type of income earned.

For example, if the foreign entity operates as a branch, the U.S. company must recognize the branch's income currently for U.S. tax purposes even if the branch does not distribute (repatriate) the earnings to the U.S. company. On the other hand, if the foreign entity is a subsidiary, U.S. tax recognition of the foreign earnings can be deferred until the subsidiary repatriates the earnings. However, if the subsidiary is a controlled foreign corporation (more than 50 percent owned by the U.S. parent) with passive, non-operating income, the U.S. parent must recognize the non-operating income currently for U.S. tax purposes whether or not the subsidiary repatriates that income. Thus, certain types of income lose the deferral privilege.[3] (See Exhibit 5 later in the article.)

If the U.S. parent defers income, it also defers taking the related foreign tax credit because the foreign taxes are not "deemed paid" until the controlled subsidiary repatriates earnings. So tax effects depend on where a company locates its supply chain facilities, the type of entity employed in the foreign jurisdiction, and the type of income produced by the entity. Exhibits 2 and 3 illustrate foreign investment with no deferral of U.S. taxes versus foreign investment with deferral.

Exhibit 2 assumes a U.S. company with foreign operations in the form of a branch. The U.S. company invests $400,000 at a 10 percent before-tax rate of return in the foreign country. The U.S. tax rate is 35 percent, and the foreign tax rate is 20 percent. All branch earnings are taxed currently in the United States with no deferral, and the company

EXHIBIT 2

**Example of No Deferral of U.S. Tax on Foreign Income Passive Foreign Investment or Branch Operation**

| | Year 1 | Year 2 | Year 3 |
|---|---|---|---|
| Beginning Cumulative Foreign Investment | $ 400,000 | $ 426,000 | $ 453,690 |
| Foreign Before-Tax ROR | 10% | 10% | 10% |
| Foreign Taxable Income | $ 40,000 | $ 42,600 | $ 45,369 |
| Foreign Rate Tax Rate | 20% | 20% | 20% |
| Foreign Tax | $ 8,000 | $ 8,520 | $ 9,074 |
| U.S. Tax Before FTC[a] | $ 14,000 | $ 14,910 | $ 15,879 |
| FTC (Not Limited) | (8,000) | (8,520) | (9,074) |
| Net U.S. Tax | $ 6,000 | $ 6,390 | $ 6,805 |
| Total Tax (Net U.S. Plus Foreign) | $ 14,000 | $ 14,910 | $ 15,879 |
| Foreign Earnings Net of U.S. and Foreign Taxes[b] | $ 26,000 | $ 27,690 | $ 29,490 |
| Ending Cumulative Foreign Investment | $426,000 | $453,690 | $483,130 |

[a] For simplicity, this example shows only the U.S. tax on the foreign taxable income component of worldwide taxable income.

[b] Assumes that foreign earnings net of U.S. and foreign taxes are reinvested in the foreign operations.

reinvests all foreign earnings net of U.S. and foreign taxes back into its foreign operations. Because the United States taxes the foreign earnings currently, less remains for such reinvestment. The exhibit shows that, after three years, the investment grows to $483,180 after U.S. and foreign taxes.

By contrast, Exhibit 3 assumes that the company conducts its foreign operations using a wholly-owned subsidiary. The subsidiary reinvests its earnings in foreign operations after foreign taxes but before U.S. taxes because U.S. taxes are not payable until the subsidiary repatriates foreign earnings to the U.S. parent. After three years, the foreign investment grows to $503,885, and the subsidiary's earnings after foreign taxes are $103,885, calculated as $503,885 - $400,000 or as $32,000 + $34,560 + $37,325. If the subsidiary pays (repatriates) this amount to the U.S. parent as a dividend, U.S. taxation will occur on the dividend grossed up to its pre-foreign tax level, calculated as $103,885 net dividend + $25,971 foreign taxes paid = $129,856.

EXHIBIT 3

**Example of Deferral of U.S. Tax on Foreign Income Controlled Foreign Subsidiary**

| | Year 1 | Year 2 | Year 3 |
|---|---|---|---|
| Beginning Cumulative Foreign Investment Before U.S. Tax | $ 400,000 | $ 426,000 | $ 466,560 |
| Foreign Before-Tax ROR | 10% | 10% | 10% |
| Foreign Taxable Income | $ 40,000 | $ 43,200 | $ 46,656 |
| Foreign Rate Tax Rate | 20% | 20% | 20% |
| Foreign Tax | $8,000 | $8,640 | $9,331 |
| Foreign income Net of Foreign Taxes | $32,000 | $34,560 | $37,325 |
| **Ending Cumulative Foreign Investment Before U.S. Tax** | **$432,000** | **$466,560** | **$503,885** |
| Cumulative Foreign Investment Before U.S. Tax at the End of Year 3 | | | $503,885 |
| Cumulative Foreign Taxable Income (Grossed Up) | | $129,856 | |
| U.S. Tax Rate | | 35% | |
| U.S. Tax on Foreign Taxable Income | | $45,450 | |
| FTC (Not Limited) | | (25,971) | |
| Net U.S. Tax | | | (19,479) |
| **Net Cumulative Foreign Investment** | | | **$484,406** |

[a] For simplicity, this example shows only the U.S. tax on the foreign taxable income component of worldwide taxable income.

[b] Assumes that foreign earnings net of foreign taxes are reinvested in the foreign operations.

Moreover, for FTC purposes, the foreign taxes are not deemed paid until this repatriation occurs. Thus, the parent claims the FTC in the repatriation year for the accumulated foreign taxes attributable to the dividend. The net cumulative foreign investment after payment of the resultant net U.S. tax is $484,406. This amount exceeds the cumulative investment from Exhibit 2 because of the deferred U.S. tax. The longer the deferral, the greater the difference between the current and deferred taxation cases. For example, if the investment period were 25 years instead of three, the difference would be $370,000.

Deferral also can affect the company's effective tax rate as reported in its consolidated financial statements. Under generally accepted accounting principles, a company can treat the deferral as permanent if the company can establish that the foreign investment is indefinite. In this situation, the deferred net U.S. taxes reduce the company's income tax expense and effective tax rate.

## Transfer Pricing Strategy

In addition to tax deferral benefits from locating operational components in foreign subsidiaries, supply chain managers in multinational organizations should consider transfer prices as their products move through the supply chain, particularly where value-added stages are located in different countries. Specifically, managers should seek to develop permissible transfer pricing strategies that shift taxable income into low tax rate jurisdictions.

For example, consider a multinational company with a U.S. parent and two foreign subsidiaries. Parent M manufactures components in the United States and transfers them to Subsidiary A, which assembles them in Country 1. Subsidiary A then transfers the completed goods to Subsidiary D located in Country 2, and Subsidiary D distributes the goods to customers in various locations. Each corporation measures its sales, costs, and profits by establishing prices—called transfer prices—to charge for the components or goods sold to the next link in the supply chain. In some parts of the supply chain, prices reflect arms-length, market-determined amounts—for example, the input costs to the manufacturing company and the sales price to customers. The intercompany transfer prices between the subsidiaries, however, determine the amount of profit occurring in each jurisdiction. (See Exhibit 4.)

In Case 1 of Exhibit 4, U.S. Parent M takes its input costs ($110,000) from outside suppliers and adds $190,000 of additional costs in the manufacturing process. It then charges Subsidiary A $500,000 for the component parts, $500,000 being the transfer price.

Subsidiary A adds $100,000 of costs in the assembly process and sells the completed goods to Subsidiary D for a transfer price of $800,000. Subsidiary D then adds $200,000 of costs and sells the goods to outside customers for $1,200,000, the total sales price.

In this case, $200,000 of profit occurs in each jurisdiction, subject to each country's tax rate. Consequently, the total foreign tax is $80,000, and the net U.S. tax is $130,000, calculated as follows: U.S. tax on worldwide profits before the FTC = ($200,000 U.S. profit + $400,000 foreign profit) x 35% = $210,000; net U.S. tax = $210,000 - $80,000 potential deemed paid FTC = $130,000.

EXHIBIT 4

**Example of Transfer Pricing**

| | Manufacturing U.S. Parent M | | Assembly Subsidiary A | | Distribution Subsidiary D | |
|---|---|---|---|---|---|---|
| | Case 1 | Case 2 | Case 1 | Case 2 | Case 1 | Case 2 |
| Sales | $500,000 | $300,000 | $800,000 | $400,000 | $1,200,000 | $1,200,000 |
| Input costs | (110,000) | (110,000) | (500,000) | (300,000) | (800,000) | (400,000) |
| Added costs | (190,000) | (190,000) | (100,000) | (100,000) | (200,000) | (200,000) |
| Profit | $200,000 | $0 | $200,000 | $0 | $200,000 | $600,000 |
| Tax rate | 35% | 35% | 25% | 25% | 15% | 15% |
| Local taxes | $70,000 | $0 | $50,000 | $0 | $30,000 | $90,000 |

Assuming foreign earnings are not repatriated to the U.S. parent, Parent M defers, perhaps indefinitely, $60,000 of net U.S. taxes on foreign profits, calculated as ($400,000 foreign profit x 35%) - $80,000 potential deemed paid FTC. Thus, Parent M incurs $70,000 of current U.S. taxes and $60,000 of deferred U.S. taxes while the subsidiaries incur $80,000 of current foreign taxes. In short, the group incurs $150,000 currently and defers $60,000.

However, an effective transfer pricing strategy can increase the benefit of tax deferrals by taking advantage of the differential tax rates in foreign jurisdictions. For example, Case 2 of Exhibit 4 illustrates a transfer pricing strategy that shifts the entire profit to Subsidiary D in Country 2, which has a relatively low 15 percent tax rate. This strategy also shifts currently taxable income out of the United States. Specifically, Parent M reduces its transfer price from $500,000 to $300,000, and Subsidiary A reduces its transfer price from $800,000 to $400,000. In so doing, no taxable profits remain in the United States or Country 1, and all $600,000 of the profit occur in Country 2 for a tax of $90,000. In this case, the net U.S. tax is $120,000, calculated as ($600,000 foreign profit x 35%) - $90,000 potential deemed paid FTC.

Again, assuming foreign earnings are not repatriated, Parent M defers, perhaps indefinitely, $120,000 of net U.S. taxes on foreign profits. In short, the group incurs only $90,000 currently (in Country 2) and defers $120,000. This increased deferral can reduce the company's effective tax rate reported in its consolidated financial statements.

To summarize, the goal of a transfer pricing strategy, in conjunction with the deferral of U.S. taxes on foreign income, is to set intercompany transfer prices so that income is maximized in low tax rate jurisdictions and minimized in high tax rate jurisdictions. Under U.S. tax law, however, tax policy and procedures attempt to establish transfer pricing guidelines and rules that clearly reflect income but do not necessarily minimize taxes or maximize deferrals. Accordingly, various tax authorities prescribe allowable methods that place constraints on a company's ability to manipulate transfer prices.

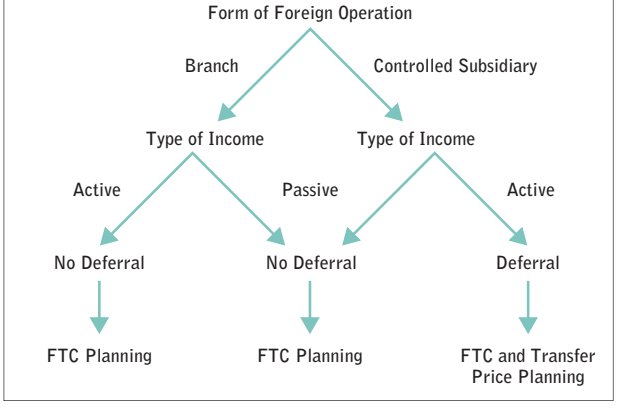
## Transfer Pricing Principles and Methods

The tax law underlying transfer pricing methods strives to establish prices that reflect an arms-length standard—that is, transfer prices on intercompany transactions should be comparable to prices that a company would charge to an unrelated party. In so doing, the tax law places a higher value on practically reliable pricing methods than on those that are theoretically correct. To attain comparability and reliability, transfer prices should reflect the following factors:

*Function Performed* – The transfer price should be commensurate with the nature and value of the func-

EXHIBIT 5

**Tax Planning Tree**



tions performed by the transferring company. For example, higher value-added functions should result in higher transfer prices.

*Risks Assumed* – The greater the risks assumed by the transferring party, the higher should be the transfer price. Examples include financial risk, credit and collection risk, product liability, and the risk of unsuccessful product development.

*Contractual Terms* – For example, transfer prices can be affected by warranties, credit terms, and contract length.

*Economic Conditions and Markets* – Market demand, geographic issues, industry conditions, and the market in which the company sells goods (e.g., retail vs. wholesale) must be considered in setting the transfer price.

Given these factors, the tax law provides four commonly used methods for establishing a transfer price for tangible goods.[4]

*Comparable Uncontrolled Price Method* – This method should be used when intercompany sales consist of commodity-like products for which a ready market exists.

*Resale Price Method* – Where a competitive market exists for the company's finished goods, the transfer price should be this market price reduced by an arm's length profit margin and other additional costs incurred by the seller. However, this method is difficult to use in the intercompany sale of partially produced goods that require significant additional processing and/or transfers to additional corporations for completion.

*Cost Plus Method* – In the absence of a market for the finished goods, this method establishes a transfer price by adding to the product cost an arm's-length gross profit markup that is comparable to that marked up by similar manufacturers.

*Comparable Profits Method* – This method does not consider either the price of the finished goods or the cost to produce them. Rather, the company assesses for "reasonableness" the profits realized from intercompany sales by each corporation in the value chain by comparing the corporation's profitability measures (e.g., return on sales or return on assets) against those of comparable companies.

The number of methods and variables available makes the selection of an appropriate and defensible transfer pricing strategy extremely difficult and inexact. A transfer price that lacks economic and legal support can be challenged by the Internal Revenue Service (IRS), which has broad authority in this area. If the IRS deems a transfer price to be incorrect, it will assess additional taxes and may impose substantial penalties as well. So a business must balance its desire for optimal tax planning with the ability to support the transfer pricing strategy adopted.

## Next Steps

The main tax themes discussed in this article can be summarized in the form of a simple decision tree, as shown in Exhibit 5. Clearly, this planning device is no substitute for the detailed discussions that must drive any overseas facility decision. But it provides an "at a glance" perspective that can facilitate conversation within the supply chain department.

Of course, the intricacies of multinational tax planning cannot and should not be part of every supply chain manager's skill set. Nevertheless, supply chain leaders still can do more to become aware of the tax implications of their decisions about locating facilities in foreign countries. Here are a few broad recommendations for how, over time, they can be better prepared to help make those decisions:

- Put the right people on the right teams; include international tax expertise on cross-functional teams for location decisions about operating facilities.
- Build ties to the tax experts in your organization—and with outside tax advisors.
- Raise the "knowledge floor" of your whole department; ensure that the members of your team acquire basic awareness of multinational tax planning.
- Urge your professional associations to build multinational tax planning into their educational curricula and conference programs.

It often has been said that a little knowledge can be a dangerous thing. But in the case of planning for overseas supply chain facilities, it is much safer, both tactically and strategically, to have some knowledge of the tax implications.

### End notes

1 "Business Fends Off Tax Hit," *Wall Street Journal*, October 14, 2009,"http://online.wsj.com/article/SB125539099758581443.html" http://online.wsj.com/article/SB125539099758581443.html

2 In the FTC context, the applicable tax rate is a function of the pool of foreign taxes that have accumulated over a number of years on foreign income deferred for U.S. purposes. In this situation, the rate effectively is an average of several years' rates. Even if a country recently has reduced its statutory tax rate, the tax pool could contain rates from prior high tax rate years.

3 The income referenced here is the so-called Subpart F income. Subpart F income also includes some specialized operating income, for example, insurance income, and foreign base company income (FBCI). FBCI includes personal holding income, certain oil-related income, related-party service income (e.g., computer repair division in a foreign jurisdiction), and other sales income involving related products in which the economic significance of the value added by the subsidiary is deemed minimal.

4 The tax law also provides a less commonly used complex method called the profit-split method.

# SUPPLIER BASE MANAGEMENT: A New Competitive Edge

By Steven A. Melnyk, M. Bixby Cooper, Stanley E. Griffis, John R. Macdonald and Cheryl L.M. Phillips

**Many companies take a purely tactical approach with their suppliers. Yet in doing so, they miss out on the benefits that come from *strategically* managing the supply base—an activity that incorporates current, potential, and even past suppliers. For guidance on how to get the process known as Supplier Base Management underway, there is no more instructive place to look than professional baseball.**

It can be said that the 1980s and the early part of the 1990s were the period of quality. The late 1990s and the early part of the first decade of the 21st century may be considered the era of lean. Now, as we enter into the second decade of the 21st century, we may fully be in the age of the supply chain. Supply chain management expands the reach of the firm beyond its immediate grasp to those places where competitive advantage is derived—in particular, the supplier base. Essentially, it is no longer firm compet-

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ing against firm—Boeing against Airbus, Target against Walmart; rather, it is supply chain vs. supply chain.

As we shift the competitive focus from the firm to the supply chain, we must recognize that, like physical chains, no supply chain is stronger than its weakest link. However, when the weakest link resides beyond the boundary of the supply chain organizer (firm), significant problems can and do occur. This is particularly true with regard to the supplier base. In fact, one recent study found that 28 percent of the firms surveyed identified supplier failure and continuity of supply as their primary supply chain risk factor.[1]

This raises an interesting issue: How does a firm ensure that it has the "right" set of suppliers in its supply chain? Addressing this cannot be left to chance. It is far too important—as any company that has suffered a supplier-related disruption can attest. The supplier base must be carefully and continuously managed. The supplier base must be managed strategically, not tactically; it must be managed with the perspective that the supplier base, like the business environment in which it operates, is dynamic and ever changing. That is, existing suppliers often leave (as a result of bankruptcy, acquisition, or changes in the buying company's strategic direction) and new, attractive suppliers enter. Finally, the firm should recognize that managing a supplier base does not always mean supplier reductions. There may be strategic reasons why the base may need to be larger, rather than smaller.

Unfortunately, most current research into the supplier base takes a more tactical view, focusing on how to best manage the existing set of suppliers and how to structure relationships with them. Further, there's been relatively little research into how to develop a system that promotes fit between the capabilities of the supplier base and the needs of the firm in ultimately serving the customer. Maintaining this fit is not merely a task of managing current suppliers. A broader view is necessary because change is constantly taking place—suppliers leave, customer needs and demands change, and corporate strategic directions shift. A new approach is emerging called supplier base management (SBM) that effectively deals with these challenges. Supplier base management is a systematic, holistic, strategic approach to planning, developing, and managing the supplier base.

This article introduces this concept and explores its implications within a supply chain context. In doing so, we draw an interesting analogy between SBM and professional baseball.

## Understanding the Origins of SBM

The concept of supplier base management originated in the "Supply Chain Management 2010 and Beyond Research" Initiative (see accompanying sidebar for a summary). During the course of this research, it became apparent that a significant number of the companies participating in the research were taking steps to proactively manage their supplier base. More importantly, they considered one of their most important challenges to be identifying and securing the best and most appropriate suppliers for their systems—a challenge they perceived as never ending because of the constant changes taking place in their supplier base. Further, they saw the need to develop additional supplier capacity to keep pace with increases in demand while developing new supplier capabilities to respond to changes in supply availability or corporate strategy.

Importantly, these views were broad-based in that they extended beyond the firm's current major suppliers to include other current suppliers, potential suppliers, and the supply chains of competitors.

These responses prompted us to begin our investigation with a central question: What is the supplier base and why is it important? Our answer was that the supplier base is essentially the upstream portion of the supply chain. This portion consists of all suppliers—first, second, third tier and beyond. The supplier base is critical for several reasons. First, it influences, and can constrain, the firm's output levels. Second, the supplier base shapes overall supply chain capabilities—that is, the types of specific problems that the supply chain can address. Third, it can shape and influence the ability to respond quickly, both to changes in market demand and to strategic changes being implemented by the firm. However, unlike the internal factory—that part of the business that we directly own and control—we typically do not own or directly control the actions of the supplier base. Yet, firms are heavily dependent on their suppliers in effectively responding to changes and demand fluctuations in marketplace.

Too often the view of the supplier base is both limited and static. This "old" view considers only those suppliers that firms currently deal with and focuses solely on managing these existing relationships. Generally, this view ignores the fact that there are other supply chains, often competing for the same set of resources. Moreover, the actions of those other supply chains can affect the performance of the firm's supply chains. In addition, their suppliers may be members of their competitors' supply chains. In contrast, a more strategic view of the supplier base is emerging. The new view takes a more holistic approach to supplier base management. It focuses on a larger set of suppliers— both current and potential. It also recognizes that the supplier base and supplier relationships are dynamic, that the desired outcomes from the supplier base may include multiple competitive

dimensions, and that competitive supply chains require close attention. (Exhibit 1 summarizes the differences between the old and new views.)

This shift in perspective raises two critical questions. First, is there a better way of understanding the supplier base and how to best manage it? Second, in looking beyond the existing set of suppliers, is there a framework that provides guidance for this extended view of supplier base management? To help find the answers to those questions, we turn to America's favorite pastime—baseball.

## "SCM 2010 and Beyond" Research

The "SCM 2010 and Beyond" Research Consortium (consisting of researchers from Michigan State University, the Darden School at the University of Virginia, Indiana University, and IMD of Lausanne, Switzerland) sought to identify the current and future states of supply chain management and to identify those factors influencing these shifts. The consortium developed and implemented a three-phase research protocol. In the first stage, the research team conducted a large-scale review of the supply chain management literature; in the second stage, they deployed a survey instrument for identifying major issues associated with supply chains of today and tomorrow; and in the third stage, they conducted four workshops on issues and developments in supply chain management. These workshops brought together representatives from over 100 leading supply chains as well as selected recognized academic researchers.

The study identified three major themes: (1) a significant and fundamental shift is taking place in the very nature of supply chains; (2) the new, evolving supply chains of tomorrow are inherently more complex because more is demanded of them; and (3) suppliers need to be actively managed to support the new supply chain realities being defined by the first two developments.

The participants characterized today's supply chain as being strategically decoupled and price-driven, while the new and emerging supply chain was described as being strategically coupled and value-driven.

By linking the supply chain to strategy and value, the participants agreed that the result was a supply chain that had to be more dynamic and more complex. These traits reflected the impact of numerous forces such as a rapidly changing technology, a changing customer base, government actions, emergence of new trading relationships, the presence of new competitors, changing strategic directions, and a supplier base that is itself dynamic.

For more information about this research and its major findings, see Melnyk, Lummus, Vokurka, Burns and Sandor (2009).

## Baseball's Insights for Managing Suppliers

Let's start with a simple but important question: "How successful in the long term would a baseball team be if management focused only on its major league players?" The answer is obvious: in the short term, it might be successful but the odds of long-term success are very low. Major league baseball managers have long known that a franchise's success is not solely dependent on the quality of the players currently playing at the major league level. Rather, sustained success requires the presence and management of three other elements: a minor league system, scouts, and a process for transitioning players from the minors to the big leagues.

Fundamental to this approach is recognizing that current players' assignment to major league rosters is not "permanent" for several reasons. First, players leave a team for a variety of reasons—for example, they get traded, injured or retire. Second, their performance may dip below accepted standards, leading to their outright dismissal. Third, if the team's playing style (strategy) changes— say, shifting focus from power to a strategy based upon speed, base hits, and maintaining pressure on the opposing team—players possessing different skills will likely be needed. Finally, young "up and comers" typically place pressure on the current roster of players as they attempt to win a call up to the big leagues.

The major league franchise's minor league teams fulfill many vital roles. Specifically, they:

- Develop future major league players by giving them additional experience through repetition/playing.
- Provide for an environment where the franchise can evaluate the capabilities and talents of these players.
- Prepare the players for the major league system by transferring general baseball knowledge and integrating them into the culture of the particular franchise.
- Provide an environment in which new and different skills and capabilities can be developed and tested (important should the franchise decide to change its strategy).
- Finally, the minor league teams provide a reserve capacity of players in the event of short- term or short-notice needs of the major league team.

Supporting both the major and minor leagues is the scouting system. In successful franchises, this system is proactive, strategic in scope, and aligned with the organization's goals. Scouting fulfills two important roles: (1)

EXHIBIT 1

**The Supplier Base: Old vs. New Views**

| Key Issues | Old View | New View |
|---|---|---|
| Which Suppliers To Focus On | Current Major Suppliers (those we do the most business with or who are important to our business) | Current Major Suppliers<br>Minor Suppliers<br>Potential Suppliers<br>Past Suppliers |
| Relationships | Current | Current<br>Future |
| Attention Spent on Past Suppliers | Minimal (since they are past, they are no longer important) | Great (knowledge transfer, discussion/ decision on technical support) |
| View of the Supplier Base | Static (change not considered) | Dynamic (supplier base constantly changing) |
| How Supplier Base Performance is Measured | Cost<br>Quality | Multiple Dimensions (depending on desired outcomes) |
| Awareness of Other Supply Chains | Low | High |

it identifies and signs potential players to be added to the team and (2) it provides a source of intelligence on skills and strategies being emphasized by opposing teams. This competitive intelligence may reveal a change in how teams and players are being managed, which in turn would call for an appropriate response.

The final element, transition management, is critical as this seeks to ensure that players coming into the major league team do so with minor disruptions—put another way, they are ready to contribute on Day 1. Part of the scouting role is to identify those players who provide skills needed and assess their fit with the team's culture. Transition management goes beyond this by ensuring the transfer of knowledge among all players, even those about to leave the team, for the betterment of the overall organization.

These four elements—majors, minors, scouting, and transition management—form an integrated process designed to ensure that the major league franchise can consistently play at and maintain a high level of performance, and remains positioned to sustain that performance. The franchise is able to grow from within (minors) and without (scouting), while easing the movement of players between the levels of the game (transition). We contend that these same principles apply not only to major league baseball franchises but also to the new view of supplier base management.

## Four Key Components of SBM

Supplier base management (SBM) is the equivalent of the baseball system for today's firm and supply chain manager. While it's based on frameworks and insights drawn from the supplier relationship management (SRM) literature, SBM is broader than SRM. As with the professional baseball system we just discussed, it consists of four major components: (1) managing the major suppliers; (2) managing the minor suppliers; (3) scouting; and, (4) transition management.

***Managing the Major Suppliers.*** Both the academic and business literature offer a great deal of information on this area of SBM. The major suppliers are those that are critical to the firm's processes and operations and have current relationships. This is the one area of SBM in which the existing knowledge base generally is most developed. Many of the activities associated with managing the majors have been identified and are widely practiced. They include, for example, setting performance measurements/metrics, managing risk, structuring the most appropriate relationships, solving problems jointly, and determining the appropriate number of suppliers.

***Managing the Minor Suppliers.*** SBM views minor suppliers as potential replacements for current major suppliers. SBM fulfills a number of critical functions for the buying firm regarding its suppliers. Specifically, the approach:

- Facilitates evaluation of these suppliers by identifying capabilities, strengths and weaknesses.
- Allows the buying firm to nurture and develop these suppliers, thereby providing the buying firm a chance to encourage those good suppliers to either fill unmet needs or to challenge current active suppliers for their place in the supply chain.
- Creates an environment for supplier education—teaching the supplier about how the buying firm's system operates, how suppliers are evaluated, and the buyer's goals and core values.
- Facilitates integration to smooth the process of integrating the supplier and its systems into the buying organization's system.
- Allows the firm to develop suppliers with capabilities different from those currently offered by major suppliers and that may be demanded in the future.

This last point deserves additional discussion. A recent article in the *MIT Sloan Management Review* argued that supply chains are outcome driven.[2] That is, they are not simply cost driven; rather, cost is one of six outcomes that can be "blended." The six outcomes iden-

tified were cost, responsiveness, security, sustainability, resilience, and innovation.

These outcomes, in turn, shape the design of the resulting supply chain. It is important, however, to understand the process by which outcomes influence the supplier base and its dynamic management. One way of thinking about this relationship is shown in Exhibit 2. Changes in the desired outcomes can result in the firm requiring capabilities different from those found within its current system. To understand these requirements, it's critical to first understand the capabilities of the existing suppliers. That is, our capabilities (what we can and cannot do) are determined by both our internal factories and external factories (the suppliers). So when new or different capabilities are required, managers must realize that they may not exist in the current supply base—and that new suppliers may be needed to provide the necessary capabilities.

A supplier, for example, with cost-reduction excellence gained through the application of lean practices may not be the best supplier to help a buyer compete based upon radical innovation. After all, many of the very practices that the supplier uses to support lean appear to work against the successful implementation of such innovation. For example, to support innovation, excess slack is needed to create the innovation, to allow debugging, to cope with the inevitable failures, and to respond quickly for wildly successful products. Yet, lean views slack as waste. Thus, a lean supplier may be highly appropriate where the desired outcome involves cost. Yet that same supplier might have to be replaced if the desired outcome becomes innovation.

There are several examples of companies that have done an outstanding job of managing the "minor league" system. Home Depot, for one, has instituted an annual Procurement Supplier Partnership Meeting that lays out the company's expectations for suppliers and also identifies those it considers to be excellent. This meeting also allows Home Depot to communicate to suppliers how their performance is to be measured. Similarly, the Home Care division of Unilever, an early adopter in building world-class supplier management capabilities according to AMR Research, has developed a formal supplier development program.[3] This program succeeds by:

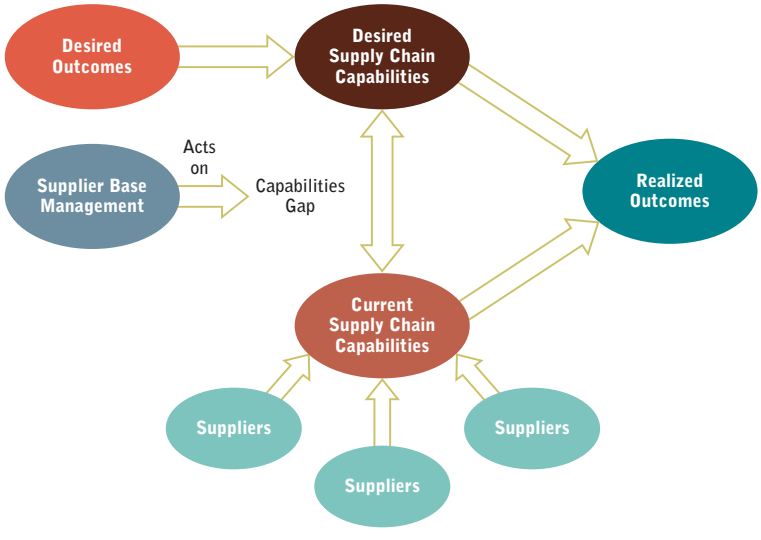
- Assessing the attractiveness of the relationship to both parties.
- Properly aligning suppliers with supply chain strategy (recognizing that all suppliers are not equal).
- Integrating product innovation, which is critical to Unilever's future business and supply chain success.
- Understanding the difference in supplier capabilities and adjusting Unilever's planning and execution systems accordingly.

***Scouting.*** The scouting process helps to identify potential suppliers that the buying organization can recruit. Rather than waiting for suppliers to approach the buyer, scouting as a proactive approach seeks to identify and recruit the best suppliers for the supply chain, while also possibly keeping them from competitor supply chains. In addition, scouting seeks to enhance the firm's attractiveness as a potential partner and buyer to these desirable potential suppliers. The U.S. military supply chain exemplifies an organization that is aggressively developing this trait. Recognizing that the pool of qualified defense suppliers was shrinking, the National Defense Industry Association (NDIA) recently embarked on an initiative to better understand what factors affect the attractiveness (and non-attractiveness) of the defense/aerospace industry to qualified small- to medium-sized enterprises.

Scouting also fulfills a competitive intelligence function regarding the supply chains of major competitors. Scouting can identify potential trends, developments, and changes taking place at competitors, thereby better positioning a firm to assess the implications of these changes. While research into competitive intelligence is

EXHIBIT 2

**Linkage Between Desired Outcomes and the Supplier Base**



well established in the marketing literature, examples of supply chain-focused competitive intelligence are limited. One that does exist involves LGE of South Korea, which is increasingly being recognized as a leading consumer electronics innovator. Samsung is one of its major competitors. As part of its scouting activity, LGE closely monitors Samsung and its supply chain. Any changes to the competitor's supply chain are studied to understand the motivation and to determine the most appropriate response.

***Transition Management.*** The last element in the SBM-baseball connection, transition management, focuses on moving suppliers into and out of the various levels of the supplier base. The objective is to limit problems created during transition. Too often, firms depend on their major suppliers for innovations, developing and maintaining drawings, and recording material and/or product specifications—yet without any plan for transferring knowledge. When a major supplier moves out of the supplier base, the buying organization may have to address such issues as managing intellectual property and any other business-critical knowledge that may reside with the supplier. Ensuring that intellectual property is protected, while dealing with the "invisible factories" the buying firm may not have been aware of, can pose significant challenges during supplier transition. The key is to have a comprehensive plan in place up front to deal with such contingencies.

Exiting suppliers may not always be willing to provide this information to the buying firm or to the replacement supplier, depending on the reason why they are exiting. In some cases, departing suppliers may even hold the firm's assets "hostage"—something that Epic Kayaks learned when it attempted to terminate its relationship with one of its key suppliers in China. (The accompanying sidebar has the story.)

## The Benefits of SBM

The benefits of supplier base management include, but are not limited to, a more cost-effective and efficient transition to alternate suppliers with minor disruptions to the firm. A SBM approach also yields greater competitive intelligence, realized by working with a more diverse set of suppliers. Greater diversity mitigates risk, too. Lower product development costs associated with a more diverse supplier base and greater continuity of supply help reduce total cost while pursuing optimum performance, quality, and service. SBM also leads to a more flexible, responsive supply base that can support changing strategic needs of the buyer—a particularly important advantage in an increasingly turbulent business climate. This last benefit is important because SBM works to ensure a fit between what the supplier base can do and the outcomes corporate strategy requires.

How close is your organization to embarking on a SBM program and realizing the kinds of benefits just

## Epic Kayak—Dealing with a Messy "Divorce"

Epic Kayaks is a Charleston, S.C.-based company that designs, manufactures, and sells performance-based kayaks around the world. In December 2008, it filed a lawsuit in a court in Hangzhou China against its Chinese manufacturer, Flying Eagle Boat Co. of Fuyang, China. The reason: the Chinese supplier refused to release Epic Kayak's proprietary kayak molds, which threatened to put Epic Kayaks out of business in China.

The roots of this dispute can be traced to the decision of Epic Kayaks to make its product in China in 2005. At that time, Epic contracted with Flying Eagle to have its kayaks built in that country. The supplier was eminently qualified, having built many of the rowing shells used by leading rowing teams around the world. While the relationship worked well initially, it started to show stresses by 2008. Because of disagreements over pricing and project management, Epic decided to end the relationship. Subsequently, it established Hangzhou Epic Boat Co., Ltd., a wholly owned subsidiary of Epic Kayaks.

The big challenge for Epic was getting all of its molds, equipment, materials, and finished product out of Flying Eagle Boat Co. The critical component in kayak making is the kayak mold, which determines the capabilities of the boats. Designers spend hundreds of hours and thousands of dollars on testing and shaping the "plugs" that are used in the molds. Essentially, molds are intellectual property.

Even though a separation agreement had been negotiated in July 2008, when the time came for Epic's assets to be moved out, Flying Eagle imposed new conditions and demands. In particular, Epic had to purchase all tooling and molds (even though Epic had paid for them initially); materials had to bought from Flying Eagle at inflated prices; if Epic hired any Flying Eagle employees, it was liable to a $200,000 penalty per employee; if Epic Kayaks continued to use the same non-proprietary high temperature resin system for mold making, it would have to pay Flying Eagle a $1 million penalty. There were no similar restrictions on Flying Eagle. In response, Epic Kayaks has sought legal relief through the Chinese legal system. Ultimately, because Epic could not wait for the lawsuits to return the molds, all the molds were rebuilt—an expensive and time-consuming proposition. For Epic Kayaks, transition management has been a painful experience.

enumerated above? To help you assess your readiness, you can review and answer the implementation questions presented in Exhibit 3.

## A "Call to Action" on SBM

The "Call to Action" for supplier base management begins by identifying your strategic suppliers. These partners are critical for their ability to provide goods and services that are essential to your organization's business. These are the suppliers upon whom you depend for sourcing on an ongoing basis. In most cases, your strategic suppliers are few in number (less than 15 percent of the total supply base). Yet their impact far exceeds their number. At the same time, these suppliers represent potential disruption points. That is, a disruption at, of, or by these suppliers—a strike, a fire, a bankruptcy, a stoppage of input materials to the supplier—can cause significant and negative long-term impacts to supply chain performance and the ability to serve customers.

Once you have identified the strategic suppliers and prioritized risk, the next step is to formulate an SBM program that—through the scouting and transition management processes detailed above—identifies, evaluates, develops, educates and integrates potential alternative suppliers into the supply chain to mitigate risk. Identifying the potential major and minor suppliers will require due diligence and competitive intelligence of the supply base. The aim is to understand who the players are, their capacities and capabilities, and who their other customers may be. Additionally, fit needs to be assessed to increase the likelihood that any transition will go smoothly. For suppliers that will be transitioning from the minors to the majors, careful nurturing and preparation is mandatory. You need to make certain that they have the requisite capability and knowledge in place so that when they are called up to the big leagues as a major supplier, they are ready to perform.

As supply chains transition from being strategically decoupled, price-driven to strategically coupled, value-driven, the tools and systems used by the supply chain professional need to move from tactical to strategic; from static to dynamic; and from narrowly focused to broad system oriented. Supplier base management enables and supports that transition.

EXHIBIT 3

### Should You Be Practicing Supplier Base Management?

- What percentage of your time is spent on:
  - Managing the major suppliers?
  - Managing the minor (but promising) suppliers?
  - Scouting?
  - Transition management?
- Is top management aware of your supplier development programs?
- Do you have formal systems in place for identifying and developing potential suppliers?
- How long would it take your supply chain to recover should a major supplier drop out?
- Do you have systems and procedures in place to identify "at risk" suppliers (suppliers who have a higher than average probability of exiting the market due to financial or strategic factors)?
- How long would it take for your supply chain to respond to a significant change in corporate strategy—say, moving from cost leadership and lean to responsiveness and innovation?
- How have you made your firm and your supply chain attractive to potential suppliers?
- If a critical competitor were to change its supply chain strategy, then:
  - How long would it take for you to identify and assess this change?
  - How would you respond?
  - Would your response be reactive or proactive (pre-planned)?

If your answer to the questions regarding minor suppliers, scouting or transition management is "None" or "Very little", you need to consider a formal SBM program. If the answer to any of the remaining questions is "No", "Don't know", Not Sure", or any similar response, you also need to consider a formal SBM program.

**End notes:**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3 Jane Barrett and Mickey North Rizza. 2009. "Six Best Practices for Building a World-Class Supplier Strategy: A Unilever Case Study." (February 24, 2009), http://www.amrresearch.com/Content/View.aspx?compURI=tcm:7-40342, accessed: April 14 2010 at 9:50 AM.

# 10 TEN TRAITS OF THE BEST SUPPLY CHAINS

By Charles C. Poirier, Morgan L. Swink and Francis J. Quinn

*This article is excerpted with permission from* ***Diagnosing Greatness: Ten Traits of the Best Supply Chains*** *by author and consultant Charles C. Poirier of CSC, Professor Morgan L. Swink of Michigan State University, and Francis J. Quinn editor of Supply Chain Management Review.*  *The book can be ordered from Amazon.com or www.jrosspub.com.*

Our premise is basic: A concerted effort to find optimized conditions across an extended supply chain network will yield superior business results. These gains can be sustained and enhanced if those directing the effort set their sights on achieving a level of competence on each of ten traits that distinguish the best supply chains. We take a broad view of the supply chain that incorporates the firm's downstream and upstream partners and relationships. The 10 supply chain traits serve as standards against which any firm in any business can calibrate itself, determine the current gaps in performance, and develop a strategy for gaining parity. By reaching excellence across these traits, a firm will improve its business performance and positioning

**The best companies approach their supply chains in a way that differs markedly from their less-successful competitors. In particular, they consistently embrace certain traits that make their operations run more smoothly and profitably. These are the traits of the supply chain leaders—practices, processes, and principles that any organization would be wise to emulate.**

in the marketplace.

To validate our premise, we must provide convincing evidence that sustained attention to supply chain management (SCM) as a business improvement tool will yield substantial results and that pursuing the 10 specific traits will move the business consistently forward. The required validation can best be met by answering these questions:

- Does SCM bring significant, measureable results?
- How much better are the supply chain leaders than others? What is the impact of the opportunity for lagging firms?
- Who are the leaders in terms of industry? Companies? And why will they remain leaders?
- What traits characterize the best supply chains?
- How will adoption and execution of these traits lead to improvements for my business?

## Results Confirm Value of Superior SCM

To begin, SCM is not just a business fad or the latest application du jour. The results of our Global Survey of Supply Chain Progress repeated over the years, coupled with other recent research, confirm that a serious supply chain improvement effort can reduce costs while increasing revenues and raising customer satisfaction. Overall profitability, earnings per share, shareholder value, and stock price performance are among the metrics positively impacted by SCM. A typical concerted supply chain initiative will provide two to four points of new profit after approximately three years. The leaders, in fact, have recorded as much as seven to eight or more points of new profits after a decade of implementation and some have doubled earnings per share.

But not everyone is achieving these results. There is a wide spectrum of performance, ranging from those businesses that fail to reap any supply chain benefits to those that have significantly enhanced their balance sheets and profit-and-loss statements. Across this spectrum, our accumulated evidence of the actual benefits achieved has revealed a tripartite segmentation of firms that can be categorized as leaders, followers, and laggards. Leaders consistently report greater progress with the SCM efforts and lead the other two categories in all 10 traits of supply chain excellence. Followers are in the middle, having achieved some progress in some of the traits, but not to the extent of the leaders. Laggards are generally focused on cost-reduction only and fall behind the other two categories in all of the traits. Our survey findings show that operational and financial benefits nearly double as a firm moves up from one category to the next—that is, from laggard to follower to leader.

## The Survey and Supporting Research

Let's begin by explaining the survey methodology, our annual reports on the survey findings, and other sources we have used to from our conclusions. The year 2009 marked the seventh consecutive year of conducting the Global Survey of Supply Chain Progress, which is jointly prepared and executed by Computer Sciences Corporation (CSC), *Supply Chain Management Review,* and the Eli Broad School of Management at Michigan State University (MSU). Initially, the survey respondent base came from subscribers to *SCMR* and CSC's client base in North America. In 2008, the Council of Supply Chain Management Professionals (CSCMP) also extended the survey to its global membership, which was particularly helpful in increasing the number of respondents from non-U.S. companies. CSC's European and Asia-Pacific operations also have been helpful in recent years in expanding the survey's global reach.

Most of the data we report here come from the 2007 and 2008 surveys sent to professionals with supply chain and logistics positions in companies around the world. Respondents rated their progress on a five-page questionnaire. Together, the data from the two surveys represent input from more than 450 responding companies.

Notable for its larger and more global respondent base, the 2008 survey included 192 respondents from North America, 42 from Europe, 41 from Asia-Pacific, and 19 from other sectors of the world—a total of 294 respondents representing 22 industries in 32 countries.

The 2008 survey contained multiple questions for each of the 10 competency areas listed below. These data, along with other qualitative and quantitative observations, helped us to identify the traits that differentiate the best supply chains. The competency areas we examined to help us identify the traits were:

- Alignment with corporate strategy.
- Strategic customer integration.
- Strategic supplier integration.
- Cross-functional internal integration.
- Supply chain responsiveness.
- Supply chain rationalization/segmentation.
- Planning and execution process and technology.
- Global supply chain optimization.
- Innovation management.
- Risk management.

CSC subject matter experts and faculty from Michigan State University analyzed the data from the survey questionnaire. Using a statistical technique known as cluster analysis, the MSU researchers identified the three groups of categories of respondents: leaders, followers, and laggards. The respondents' scores within each group reflect a distinct pattern of competence achievement. Leaders' scores on all 10 traits are superior to and statistically different from the scores of the followers and laggards. Similarly, followers outperform laggards on all10 traits. These achievement-based groupings serve as the foundation for our comparisons.

The research team also compared our survey results to data from comparable surveys conducted by reliable organizations such as AMR Research, Gartner, Forrester, and Accenture. To corroborate our findings we reviewed documents and results published by other sources, which are cited in the text. Using a variety of materials and professional opinions, we substantiated the gains reported and established a pattern that identified the ten traits critical to sustained success.

## Ten Traits Characterize Leadership Abilities

Before examining the traits that characterize supply chain leaders, let's first recap the process through which we came to our conclusions. As noted earlier, our surveys were designed around 10 competency areas. Specific survey questions within each competency yielded insights into the different practices among leaders, followers, and laggards. In addition, we analyzed differences in their supply chain-related investment patterns, stated motivations and objectives, use of certain tools and technologies, level of management involvement, and operational performance. We'll refer to these findings as we explain what differentiates the leaders from the others, and how these traits of excellence make a difference to overall business performance.

Here are the 10 traits of the leaders that collectively add up to supply chain greatness.

1. Sound strategy supported by solid leadership.
2. Intense focus on financial metrics.
3. Commitment to innovation and process improvement
4. Close collaboration with selected partners.
5. Superior strategic sourcing
6. Excellence in logistics execution
7. Proficiency in planning and responsiveness.
8. High customer integration and satisfaction.
9. Ability to anticipate and manage risk.
10. Global optimization.

## 1. Sound Strategy Supported by Solid Leadership

Supply chain planning and decision making must be integrated with higher-level business strategies to affect sustained improvement across the extended enterprise. Despite years of exhortation to break down the walls of conflict or indifference between internal business units and functions and between external business partners, most firms still have not heeded the call. Elimination of functional and business unit stovepipes, coupled with close collaboration with external partners, is fundamental to any measure of supply chain success. The leaders understand that.

The first trait involves establishing a compelling strategy with a clear, effectively communicated charter for continuous process improvement throughout the enterprise. Management must be fully aligned with that charter and be committed to a set of guiding principles. The strategy needs to be executed under the best possible leadership and management structure, and supported by people who are qualified to design, initiate, and execute innovative procedures.

The secret is to work vertically and horizontally throughout the business, engaging the people involved in the various process steps. In this way the organization can more effectively learn the root causes of problems and then apply appropriate solutions. With this first leadership trait firmly in place, companies can more

readily identify and overcome cultural inhibitions and structural barriers to needed change.

## 2. Intense Focus on Financial Metrics

Nearly every company can benefit from closer collaboration between the supply chain and its financial groups. The goal is to help the financial folks more clearly understand the direct impact of supply chain initiatives on financial performance. The odds of acquiring additional resources or attaining funding for a supply chain initiative improve dramatically when finance understands the impact on business performance. Financial help with the application of activity-based costing, balanced scorecards, and measurement dashboards, for example, provides the kind of validation needed to demonstrate the potential value of a supply chain initiative. It also eliminates many time- and resource-consuming actions that do not bring the kind of benefits anticipated—by showing the lack of actual financial benefits.

Our research unequivocally confirms that when the financial function takes a keen interest in the supply chain and helps to identify where it can add value to the business, results dramatically improve. In our personal contacts with supply chain managers, we consistently find they have a full plate of improvement initiatives that exceed both the financial and management resources available. We also note that when finance applies its expertise to identifying the business impact of supply chain proposals, a significant number (up to one third of more) fall off the plate.

Our book points out the route to total cost improvement by explaining how this trait manifests itself among the leaders. The key, we found, is applying talented and scare resources to those actions that have the greatest effect on customer satisfaction and financial performance. In parallel, we issue a call for marketing and sales to become more involved in matching customers' needs with supply chain capabilities in order to deliver above-average performance without bankrupting the business.

## 3. Commitment to Innovation and Process Improvement

It's not just about doing things better anymore; it's doing better things through a portfolio of initiatives that are matched to the business needs. That means not only seeking new ways to improve a supply chain but also effectively managing change—both the desired changes form the supply chain initiative and the change necessary to adapt to new technology and to respond to dynamic market conditions.

Our evidence shows that, in addition to the supply chain initiatives themselves, the leaders apply other business techniques to optimize performance across the key process steps. For example, they aggressively seek to eliminate all waste and nonvalue-adding steps in the end-to end system. They apply quality standards to identify and eliminate root causes, keep customers satisfied, and maintain the business position. The leaders also outsource selectively to the most capable business partners as part of an overall network optimization.

Six Sigma, total quality management (TQM), and vendor-managed inventory (VMI) are among the specific process improvement techniques often employed by the leaders. Tools such as enterprise resource planning (ERP) and radio frequency identification (RFID) technology also are rigorously applied to further improve processes. The leaders today are paying particular attention to increasing visibility as a way of more effectively matching what is in demand with what is in the delivery network.

Perhaps more importantly, the leaders are not bound by their cultures and past practice when it comes to pursing innovation or improving processes.

## 4. Close Collaboration with Selected Partners

The fourth trait has to do with segmentation of different types of relationships with various types of suppliers and customers—that is, the extent to which companies recognize the varied business requirements and accommodate for them in supply chain structures. Achieving superior supply chain performance requires segmenting customers and suppliers, and then working diligently with key business partners. And that, in turn, requires careful analysis to identify partners that share a similar business philosophy and are eager to work together for mutual benefit in an atmosphere of trust. This leadership trait clearly emerged not just from the survey data but from our analysis of business trends overall.

The business arena today is a global one. Recognizing this, the leaders are moving beyond an internal improvement focus in which knowledge is shared only within the organization's four walls to a broader focus in which partners are carefully selected and collaborating is nourished across the extended enterprise. Creating such a collaborative culture is a necessary prerequisite to achieving supply chain success.

Our book lays out the roadmap to achieve success on collaboration. We detail why it must be a serious and selective endeavor approached with great care. Systems need to be established to enable secure knowledge trans-

fer, ERP-to-ERP becomes the new channel of communication, accomplished with well-honed business process management skills. Currently, it's mainly the leaders who have mastered these capabilities.

## 5. Superior Strategic Sourcing

To make substantive financial gains, a company needs to bring focus to its spending. From a supply chain perspective, that means paying particular attention to purchasing, procurement, and strategic sourcing. All evidence points to the fact that this function can make one of the largest contributions to profitability. In our book we explain how this key process step should be approached and executed with best-in-class results. The discussion brings together purchasing, procurement, and sourcing as process steps. It also presents a synthesis of leading practices, drawing mainly on our survey and from articles that have appeared in *Supply Chain Management Review.*

Among other competencies, success in strategic sourcing requires an effective supplier selection procedure as well as a rigorous decision-making process to determine when it's preferable to keep a process in house or to have it outsourced or moved to an offshore location. Global sourcing is the new mantra, and we lay out the implications of global sourcing for overall supply chain performance—not just from the perspective of reducing costs but also in terms of building trust and lasting relationships with a central core of strategic suppliers. When this greatness trait is in place, key suppliers become active in planning and developing joint strategies for improving network performance.

## 6. Excellence in Logistics Execution

A critical supply chain process centers on those multiple activities under the umbrella title of logistics, which includes warehouse management, transportation management, integrated logistics solutions, delivery strategies, and supply chain execution. Using the results from the survey and data from MSU studies and practices, we developed a contemporary logistics model for achieving supply chain excellence. The model essentially is a framework for progression, from the initial position to the desired level of logistics excellence. It includes these five levels:

- *Framework Level 1: Calibrate the Beginning.* In Level 1, the firm typically begins to focus on reducing the overall costs of logistics from an internal viewpoint. At this position, it seeks to identify its starting point and determine how far it might proceed. It examines such factors as shipping and receiving costs, techniques for loading and unloading at various sites, and order management. In general, the firm tries to find better ways to control the amount of inventory used to support operations and customer satisfaction.
- *Framework Level 2: Achieve Logistics Capability.* In Level 2, the firm establishes a logistics center that evaluates total costs across the organization. As the firm begins to leverage transportation and storage the same way it does purchasing volume, it moves closer to traffic optimization. It examines service requirements, on both the inbound and outbound side of manufacturing, to determine if another supply chain partner can make the deliveries more economically and efficiently.
- *Framework Level 3: Leverage e-Commerce.* The aim here is to use internet technology and cyber-based tools, internally and externally, to enhance logistics processing. Now the company takes advantage of its internal data analysis and, with the help of external advisors, starts moving toward the virtual logistics network. With some of its most trusted allies, the firm performs a network cost analysis and develops the end-to-end visibility so important to the contemporary logistics model.
- *Framework Level 4. Tap Network Opportunities.* In the fourth level of the logistics framework, logistics strategy truly becomes a network experience as efforts are integrated across multi-tiers of partners. With the assistance of key allies and relying on data readily accesses internally and externally, the focus moves to the extended enterprise and the shipment and storage activities across multiple organizations.
- *Framework Level 5: Build and Advantage.* This level is the province of only the most sophisticated of networks. It requires the formation of joint logistics models and involves full communication connectivity across the extended enterprise. Total costs are evaluated through the connecting electronic communication systems.

Achieving delivery excellence emerges not as a science but rather as an art of execution. Essentially, it's based on having the right information on what is needed and what can be delivered.

## 7. Proficiency in Planning and Responsiveness

Trait No. 7 speaks to the extent to which planning and execution are comprehensive and rigorous and embrace stakeholders from different functions and business partners in the extended enterprise. Proficiency here entails having the appropriate response system matched to what the customers really want and need. This critical capability requires close and continuous attention (not the cursory attention often paid) across the various supply chain relationships.

One of the consistent findings from the annual surveys is that sales forecasting is a significant problem in nearly all organizations. Respondents indicate that, of all the supply chain activities, forecasting has improved the least over the years. Results further show that leaders achieve a relatively higher level of competency on this trait primarily by using S&OP. Through this technique, they bring a discipline to planning and are able to garner useful information to match more closely actual demand with actual supply capability.

There is a strong tendency within business to withhold the most accurate demand information. The governing assumption is that suppliers will incur the extra costs for making what amounts to heroic responses in times of need. In the long run, this approach hurts business performance. Companies instead need to focus intently on improving their sales forecasting in order to better match supply and demand and to reduce inventories to what is actually needed in the supply chain.

## 8. High Customer Integration and Satisfaction

The survey data reveal clear differences among the customer approaches taken by companies in the leader, follower, and laggard categories. In general, most firms are not nearly as customer oriented as their business rhetoric would suggest. The 2008 survey showed, for example, that only 40 percent of firms have changed from a push to a pull orientation for driving their supply chain. Thus, whereas, a few firms are responding to actual customer needs, many are still pushing production into inventory.

Customer metrics make a difference in business success. The superior top-line growth of leaders attests to their ability to achieve perfect orders, *one version* of the truth, on-time deliveries, high fill rates, low returns, and more. The remaining firms tend to push goods into the supply chain and hope the sales group can move them to customers, often at discounted prices.

The leaders are using business intelligence and a stronger customer focus to outdistance rivals in terms of satisfying customers and generating new revenues with lower inventories. One of the secrets is to utilize contemporary customer-facing technology to get beyond the weak information generally provided by sales forecasts.

## 9. Ability to Anticipate and Manage Risk

Going forward, an organization's ability to manage supply chain risk proactively will no doubt demand increased attention. In fact, it will be the mark of the advanced supply chains of the future. Although a few select firms have become adept at risk management across their global supply chains, the overall results from our surveys have been disappointing in this regard. In reviewing the 2008 data, we were discouraged by the lack of urgency paid to this critical issue. While most respondents recognized the need for contingency plans, far fewer had actually developed and implemented them.

Unfortunately, effective risk management capabilities are currently found only among a small cadre of leadings forms. Going forward, though, risk management must become a core capability of any supply chain organization that hopes to succeed. Leaders understand risk. They know how to prepare for both expected and unexpected disruptions, and they have contingency actions that can be readily put into effect. Others give lip service to risk management. Their "plan" is to wait for a disruption to happen and they rely on heroic efforts to overcome the situation—whatever the cost. In short, they assume a completely reactive posture.

## 10. Global Optimization

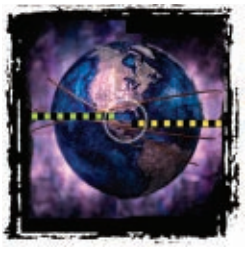
Throughout our book, we stressed collaboration as an ingredient of greatness. Add to that a complementary feature—the ability to use technology as an enabling factor for success. The combination of the two elements provides a powerful capability that enables supply chain leaders to maximize their global resources and opportunities. The final trait—the ability to optimize a global network of resources—clearly distinguishes supply chain leaders from others in their industry. In effect, global optimization represents the culmination of the nine greatness traits that have preceded it.

These ten traits from a roadmap for achieving greatness in any supply chain. Some traits are more important to certain businesses and industries than others. Moreover, while pursuing excellence in all of these traits might be a laudable aspiration, it's not always realistic. For these reasons, our book provides some advice on how to prioritize a few of the more important traits to the organization and then work on achieving excellence one by one.

# Rethinking IT Application Outsourcing Contracts

***With IT application development and maintenance outsourcers fighting to hang on to business, now is the perfect time to revisit outsourcing contracts.***

**By Bob Haas, Arjun Sethi and Venkat Tummalapalli**



With the economy in turmoil, growth in the once-booming outsourcing sector slowed down in 2009. As U.S. and European unemployment hovers near 10 percent, the political reaction to offshoring is likely to be negative—and possibly even punitive.

Yet the turmoil makes this an ideal time for firms to launch or expand their outsourcing initiatives. It is well known that outsourcing can lead to substantial cost savings and improve operational efficiency. A good example is IT application development and maintenance (ADM) outsourcing. With competition rising among ADM vendors and prices falling, companies can improve existing contracts, find bigger cost savings, and restructure supplier relationships to increase process efficiencies.

Communicating the importance of these cost-reduction methods to stakeholders will be crucial to the success and acceptance of these initiatives.

## Adapting to the New World Order

The economic crisis has challenged the status quo for IT ADM vendors, who have seen their steady and substantial growth suddenly slowed.

In response to the turmoil in the United States, these vendors are diversifying—both to new regions, such as Europe, Asia and the Indian domestic market, and to new industries, such as media, healthcare, retail and telecom. At the same time, vendors may be willing to offer more competitive deals to new and existing clients. As their staff utilization sinks, many are focused on retaining their existing clients (and maintaining market share) by providing more value. For example, many vendors are willing to offer subject matter experts to support a client's innovation efforts.

While companies can take advantage of current market conditions to reduce costs and enhance the quality of service, they ought to proceed cautiously. Although market conditions are favorable, they need to perform due diligence to help identify vendors who may be trying to undercut their competition without offering any advantages. For example, one of our financial services clients recently rejected an outsourcer with the lowest rates because the firm could not sustain high-quality service or maintain efficiency gains.

Firms can improve their outsourcing initiatives by following these four guidelines:

**1. Simplify structure.** Overabundant, redundant and inconsistent job titles often cause confusion about what each role does and leads to unnecessary costs. For example, one firm's relationship with an IT ADM vendor evolved into more than 150 different roles. Intended as a way to ensure accurate pricing for each role, the arrangement instead resulted in unwieldy complexity, poor allocation of resources and, ironically, difficulty in assessing price competitiveness. Our analysis revealed that the 150 disparate roles (given arcane names such as ProphIT Architect and ICM Design Lead) could be simplified to

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a standardized set of functions. Once the roles were condensed to a manageable number, the company could align the roles with industry standards and still meet its business needs. These changes alone saved between 10 to 25 percent of addressable spend.

**2. Engage in joint process-improvement activities.** Adhering to system development life cycle best practices improves collaboration and process discipline with vendors while reducing potential implementation delays. Most vendors are willing to invest their available resources to help their clients improve internal processes for mutual benefit.

**3. Analyze and benchmark cost drivers.** Examining both personnel and non-personnel costs of IT ADM vendor agreements can lead to cost savings. Leading companies are using the current market downturn to obtain more transparency into their contracts and thus better understand vendors' costs. Once competitive rates have been established with a new contract, this transparency, coupled with strong benchmarking clauses, will make it easier to maintain competitive rates and usage patterns.

The target mix of onsite vs. offshore personnel is 20 percent and 80 percent, respectively. But many companies struggle to manage 70 percent or less offshore staff because of political issues and concerns about data security, among other things. In flat-fee or blended-rate structures, vendors often move their own work offshore to increase their profit margins. Maintaining a transparent and competitive rate in each area of operation ensures that clients are paying the right amount in these cases. The same diligence is necessary to curtail unnecessary costs such as program licenses, telecom, vendor overhead, training and travel.

**4. Negotiate better terms.** Given the economic downturn, IT ADM suppliers have less demand and are therefore competing for existing jobs. Firms are in a prime position to negotiate for deeper discounts, innovation support, and additional subject matter experts. For example, a recent client negotiated a new seven-year contract with its existing provider that fixed rates for its ADM labor and offered protection against wage increases and currency changes.

An aggressive negotiation strategy balances collaborative restructuring to reduce costs and improve services—and introduces competitive market pressure if objectives are not met. For example, vendors that meet long-term contract objectives are rewarded, while those that do not meet objectives or refuse to provide concessions are denied the business. Regardless of the strategy, though, contract language should always encourage continuous improvement and competitive pricing.

Performance metrics will ensure that projects meet all stakeholder expectations. For example, productivity can be measured by the cost of systems maintenance, price per change in function point, the cost of reworks or bug fixes, and turnaround time. Services can be measured by reviewing the quality of the application (the time-to-failure and fault-defect ratio), change management processes, accurate estimates and on-time delivery of projects, and whether or not vendor personnel have software engineering certifications.

**An aggressive negotiation strategy balances collaborative restructuring to reduce costs and improve service—and introduces competitive market pressure if objectives are not met.**

Other performance measurements might include tracking projects that stay within budget, overall budget variance, hidden or one-time costs charged to the client, and flexibility in the contract so the client is not locked into outdated solutions or technology. Client satisfaction can be measured through customer-satisfaction surveys and by gauging how quickly problems are resolved, what escalation procedures are in place, and if innovation or support produces tangible business results.

Despite the seemingly negative economic and political environment, companies are likely to continue developing and maintaining their IT applications. Renegotiating vendor contracts will ensure more advantageous relationships, and improving outsourcing strategies will help mitigate risks. While the road ahead will continue to be bumpy, companies can manage risks successfully by improving their outsourcing strategies.

A SPECIAL SUPPLEMENT TO
SUPPLY CHAIN MANAGEMENT REVIEW

## Special Report: Top 50 Global 3PLs



# TOP 50 GLOBAL 3PLs: Modest gains ahead

**Having hit bottom in 2009, the 3PL sector is headed for a rebound. Analysts say that some providers will continue to expand globally even if their corporate identities remain fixed to sovereign states. However, research also indicates that near-shoring is a growing trend, giving "domestic" players more of an advantage.**

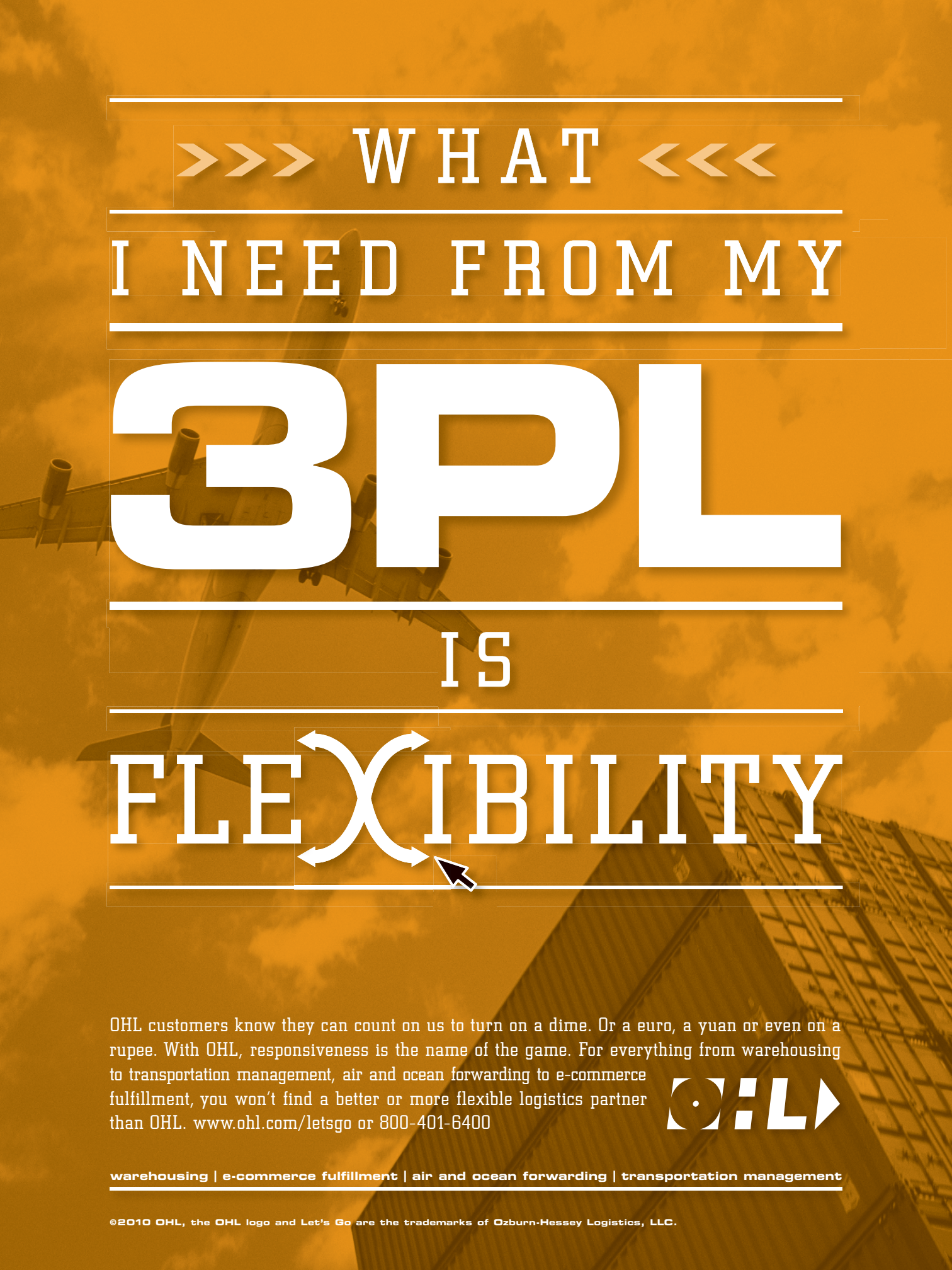
By Patrick Burnson, Executive Editor

In lock step with the global economic nosedive, domestic revenues for the third-party logistics (3PL) market sank last year.

"It wasn't pretty," says Evan Armstrong, president of Stoughton, Wisc.-based Armstrong & Associates. He says that the only thing the top players—both global and domestic—had in common was that "none of them made much money."

According to Armstrong's *2010 U.S. and Global Third-Party Logistics Analysis*, the international transportation management (ITM) segment of the 3PL services market took the biggest hit. Its gross revenue (turnover) fell 23.7 percent as total U.S. import and export ocean twenty-foot equivalent units (TEUs) dropped 12.3 percent. Airfreight metric tons dropped similarly with reductions at JFK and the Chicago airports exceeding 20 percent. As prices dove in the face of soft demand, net revenues (gross margins) for airfreight shrank by 18.9 percent. Expeditors International, the largest U.S. freight forwarder, saw gross revenues decrease 27 percent and net revenue decrease 14 percent.

The good news is that first quarter 2010 results have included double digit improvements in

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ITM and other 3PL market segments as the economy steadily recovers.

Overall, U.S. 3PL market gross revenues decreased 16 percent in 2009 dropping to $107.1 billion. The dedicated contract carriage (DCC) segment fell 16 percent, while domestic transportation management (DTM) was down 15.1 percent in gross revenue and 11.4 percent in net revenue. Value-added warehousing and distribution (VAWD) suffered with only single digit reductions.

The VAWD segment's gross and net revenues were both down 5.3 percent and 6.9 percent, respectively, compared to 2008. Net income margins dropped in all categories. Net income in the ITM segment had a 6.3 percent drop. VAWD took the deepest plunge with a 25 percent drop. Overall, the 3PL net income margin dropped from 5.3 percent in 2008 to 4.7 percent in 2009.

"We anticipate a significant recovery for 3PLs in 2010," says Richard Armstrong, co-author of the report. "Many first quarter results suggest a recovery that will restore the third-party logistics market to 2007 levels, and we predict 13.4 percent growth in gross revenue and 8.3 percent growth in net revenue in third-party logistics for 2010."

Shippers may now be left wondering whether service metrics will be tightened along with this slight surge.

### Flags of convenience

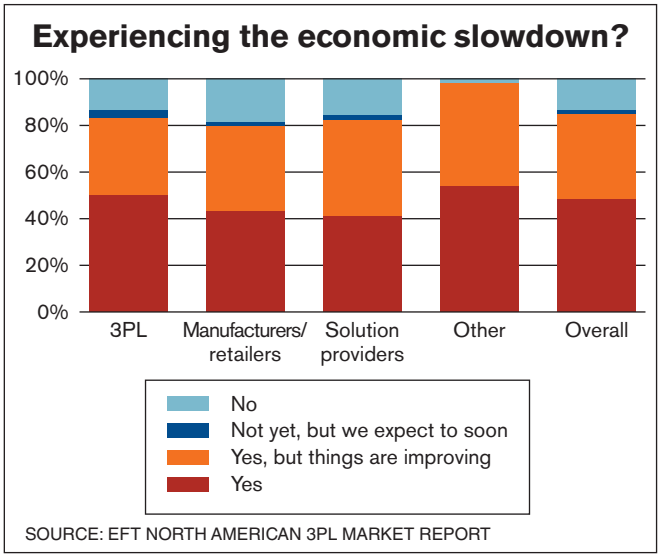
Richard Armstrong did not have an immediate answer; however, he did note that the line between domestic and global players continues to blur, saying that the 3PL industry mirrors what has occurred in the ocean carrier sector over the years.

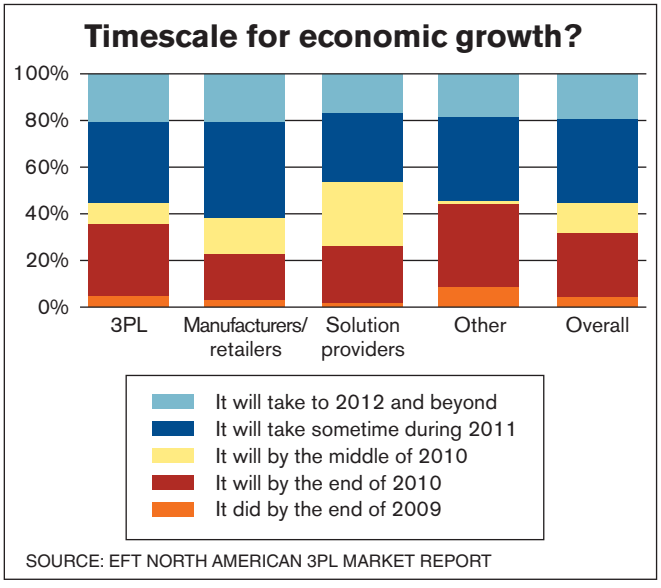
"Does it really matter if you book cargo on a vessel that is based in Denmark?" he asks. "It's carrying containers from Korean and Japanese shippers, and may even be sailing under a flag of convenience. The national identity is gone, and the idea of doing business in a single national market is nonsense."

He also noted that the U.S.-based multinational shipper McDonalds makes more money in foreign markets overseas. "So that's what's happening to the paradigm," he says. "Most of the really big 3PLs are following the same model. To be purely domestic is to remain stuck in one place, and no one is going to sacrifice potential revenues to do that."

At the same time, however, Armstrong maintains that some 3PLs are stronger in one region than another—and, by that measure, the "domestic" category is still valid. "But since the greatest growth is going to take place in India and China in the coming years, we are concerned about 3PL service in the U.S.," he says. "If it's all outsourced, this country will be a fading power…like Great Britain in the 20th Century."

London-based Eyefortransport (EFT) may take issue with the historical allusion of this statement, but certainly not with the insight. Research done by the analysts for its *North American 3PL Market Report* suggest that a modest rebound must take place this year to keep the U.S. and its hemispheric neighbors in the game.




The report focuses on the opinions of logistics service providers (3PLs/4PLs), manufacturers, retailers, as well as supply chain technology providers to offer a comparative view between these groups of respondents. The report also pays particular attention to the state of the global economy along with other shipper concerns.

"The end of 2009 going into 2010 has been a time of challenges and opportunities in the supply chain and logistics industry," says Katharine O'Reilly, EFT's senior vice president of research. "On the one hand, the fallout from the recession continues to rock all industries. Yet on the other hand, the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## Armstrong & Associates Top 50 Global 3PLs - May 2010

| Rank | Provider | 2009 Gross Revenue (USD Millions)* |
|---|---|---|
| 1 | DHL Supply Chain & Global Forwarding | 32,494 |
| 2 | Kuehne + Nagel | 16,014 |
| 3 | DB Schenker Logistics | 15,696 |
| 4 | Nippon Express Co. Ltd. | 15,390 |
| 5 | CEVA Logistics | 7,637 |
| 6 | C.H. Robinson Worldwide, Inc. | 7,577 |
| 7 | UPS Supply Chain Solutions | 7,516 |
| 8 | DSV Solutions Holding A/S | 6,856 |
| 9 | SDV International Logistics | 5,604 |
| 10 | Agility | 5,594 |
| 11 | Panalpina World Transport (Holding) Ltd. | 5,481 |
| 12 | Toll Holdings Limited | 5,129 |
| 13 | DACHSER GmbH & Co. KG | 4,504 |
| 14 | Geodis | 4,209 |
| 15 | Sinotrans Ltd. | 4,196 |
| 16 | Expeditors International of Washington, Inc. | 4,092 |
| 17 | GEFCO | 4,014 |
| 18 | Norbert Dentressangle Group | 3,779 |
| 19 | Wincanton Logistics | 3,707 |
| 20 | UTi Worldwide Inc. | 3,568 |
| 21 | Hellmann Worldwide Logistics GmbH & Co. KG | 3,433 |
| 22 | NYK Logistics Co., Ltd./Yusen Air & Sea Service Co., Ltd. | 3,417 |
| 23 | Caterpillar Logistics Services, Inc. | 3,119 |
| 24 | Penske Logistics | 2,387 |
| 25 | GENCO Supply Chain Solutions | 2,310 |
| 26 | Pantos Logistics Co., Ltd. | 2,285 |
| 27 | Kintetsu World Express, Inc. (KWE) | 2,118 |
| 28 | Fiege Logistics AG | 2,085 |
| 29 | Damco | 2,012 |
| 30 | Sankyu Inc. | 1,743 |
| 31 | GLOVIS | 1,672 |
| 32 | Nissin Corporation/Nissin Group | 1,644 |
| 33 | Ryder System, Inc. | 1,611 |
| 34 | Logwin AG | 1,547 |
| 35 | Hub Group, Inc. | 1,511 |
| 36 | FedEx Supply Chain Services/FedEx Trade Networks | 1,503 |
| 37 | Menlo Worldwide Logistics | 1,326 |
| 38 | BDP International | 1,220 |
| 39 | Arvato Logistics Services | 1,207 |
| 40 | VersaCold Logistics Services | 1,180 |
| 41 | BLG Logistics Group AG & Co. KG | 1,138 |
| 42 | Kerry Logistics Network Ltd | 997 |
| 43 | OHL | 991 |
| 44 | Transplace | 990 |
| 45 | APL Logistics | 976 |
| 46 | Werner Enterprises Dedicated & Logistics | 878 |
| 47 | Landstar Global Logistics, Inc. | 824 |
| 48 | NFI | 810 |
| 49 | Greatwide Logistics Services, LLC | 781 |
| 50 | Americold Logistics, Inc. | 761 |

*Revenues are company reported or Armstrong & Associates, Inc. estimates and have been converted to USD using the average 2009 exchange rate in order to make non-currency related growth comparisons.

green shoots of recovery and the opportunity to gain new market share and develop new innovative strategies and relationships has opened up sections that were previously closed due to the relative stability."

### Brighter picture

Respondents to EFT's North American 3PL Market Report were asked in early 2010 whether their companies were experiencing the economic slump within their business operations. The

**"We anticipate a significant recovery for 3PLs in 2010. Many first quarter results suggest a recovery that will restore the third-party logistics market to 2007 levels."**

*–Richard Armstrong, Armstrong & Assocaites*

research team found that 51 percent of 3PLs reported that they were experiencing a slowdown, compared to 44 percent of manufacturers/retailers and 42 percent of solution providers.

In response to a related question, 34 percent of 3PLs reported that they were hurting as well, but said that things are improving as compared to 37 percent of manufacturers/retailers and 42 percent of solution providers.

Only 3 percent of responding 3PLs reported that they were not affected by the downturn, as compared to 2 percent of manufacturers/retailers and two percent of solution providers. Twelve percent of 3PLs reported that they were not experiencing the economic slowdown and were not expecting to soon, as compared to 17 percent of manufacturers/retailers and 14 percent of solution providers.

"These results paint a far brighter picture than those of last year," says

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**Armstrong & Associates Top 30 Domestic 3PLs - May 2010**

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| 2 | UPS Supply Chain Solutions | 7,516 |
| 3 | DHL Supply Chain/Exel | 5,187 |
| 4 | Expeditors International of Washington, Inc. | 4,092 |
| 5 | UTi Worldwide Inc. | 3,568 |
| 6 | DB Schenker Americas | 3,170 |
| 7 | Caterpillar Logistics Services, Inc. | 3,119 |
| 8 | Kuehne + Nagel, Inc. (The Americas) | 2,921 |
| 9 | Penske Logistics | 2,387 |
| 10 | GENCO Supply Chain Solutions | 2,310 |
| 11 | CEVA Logistics (The Americas) | 2,235 |
| 12 | Ryder System, Inc. | 1,611 |
| 13 | Hub Group, Inc. | 1,511 |
| 14 | FedEx Supply Chain Services/FedEx Trade Networks | 1,503 |
| 15 | Menlo Worldwide Logistics | 1,326 |
| 16 | BDP International | 1,220 |
| 17 | VersaCold Logistics Services | 1,180 |
| 18 | OHL | 991 |
| 19 | Transplace | 990 |
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| 21 | Werner Enterprises Dedicated & Logistics | 878 |
| 22 | Landstar Global Logistics, Inc. | 824 |
| 23 | NFI | 810 |
| 24 | Greatwide Logistics Services, LLC | 781 |
| 25 | Americold Logistics, Inc. | 761 |
| 26 | J.B. Hunt Dedicated Contract Services® | 757 |
| 27 | syncreon | 750 |
| 28 | Phoenix International Freight Services, Ltd. | 733 |
| 29 | Ruan Transport Corporation | 680 |
| 30 | Jacobson Companies | 628 |

*Revenues are company reported or Armstrong & Associates, Inc. estimates and have been converted to USD using the average 2009 exchange rate in order to make non-currency related growth comparisons.

O'Reilly, "when 93 percent of 3PLs and 90 percent of manufacturers/retailers reported that they were experiencing the economic slowdown."

Although this year's results were more positive than last year's, they remain markedly more negative than the results from 2008 when only 43 percent of 3PLs and 41 percent of manufacturers/retailers were affected by the recession.

3PL respondents were also asked if they are seeing an increase in "near sourcing" by their customers. In the last three years, the most common response has been that respondents have seen a slight increase (43 percent in 2010; 55 percent in 2009; and 69 percent in 2008). The second most common response has been that respondents have seen no increase (33 percent in 2010; 30 percent in 2009; and 17 percent in 2008), while the least popular response has been that respondents have seen a significant increase (23 percent in 2010; 15 percent in 2009; and 14 percent in 2008).

While the levels of responses have been broadly similar over the last three years, there has been a notable polarization each year, with fewer people seeing a slight increase, and a larger number seeing either no increase or a significant increase. According to O'Reilly, this trend was more apparent in the 2010 results compared with those of 2009.

But it's worth noting that a certain contradiction is contained in the section of the report where 3PL respondents were also asked to identify the regions in which they see the greatest revenue growth opportunities for their companies. The result: North America, the say, is absolutely critical.

**"On the one hand, the fallout from the recession continues to rock all industries. Yet on the other hand, the green shoots of recovery and the opportunity to gain new market share…has opened up sections that were previously closed due to the relative stability."**

*–Katharine O'Reilly, Eyefortransport*

"While results from the 2008 and 2009 surveys were markedly similar in this area of questioning, the results from this year's survey were dramatically different," says O'Reilly.

Indeed, the majority of 3PL respondents (72 percent) saw their greatest opportunities being in North America, whereas only 8 percent and 6 percent selected this region in 2009 and 2008 respectively. A similar number in 2010 (47 percent) saw China as the most promising region, as compared to 2009 (51 percent) and 2008 (61 percent). The Asia-Pacific region (not China or India) also showed similarity in results between 2010 (36 percent), 2009 (31 percent), and 2008 (32 percent).

## Be reasonable

Other pressures may drive strategic change too, says Richard Armstrong, who believes that the supply chain may

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be shortened if the currency imbalance continues to be an issue with China. Near-shoring, he says, makes a lot more sense if long-term and sustainable profits can be realized.

"It's going to be very interesting to see if 3PLs will begin to concentrate on businesses with production facilities in North America," says Armstrong. "From a foreign currency exchange perspective, it seems to make sense."

Meanwhile, change in the 3PL sector remains glacial, according to Armstrong. With the exception of DB Schenker, bold moves into new markets have not been evident. "Schenker is somewhat visionary," says Armstrong, "in that it's growing its contract logistics at a very rapid pace. Shippers should not assume that this is being done across the board with 3PLs."

In fact, the biggest word of advice Armstrong has for shippers this year is this: Be reasonable.

"Don't expect a lot of change in service levels this year," he says, "and don't rely on new providers coming into the marketplace. Unless a multinational manufacturer like Caterpillar comes into the 3PL sector, it's going to be the same group of guys. The threshold for entry is very high, and requires a big commitment to operate on a grand scale."

*–Patrick Burnson is Executive Editor of* Logistics Management

# The three dimensions of distribution excellence

**To achieve the potential of distribution excellence, companies need to think outside of the box and optimize their 3PL partnership.**

By Joachim Ebert, Kumar Venkataraman, Michael Hu


What allows certain companies to deliver best-in-class distribution performance while others turn in only average performance or fail altogether?

From our work in this area, we've observed that the leaders in distribution—those that deliver on a defined set of quality and service levels at the best possible cost—consistently think outside the box. They push their competitiveness to an efficiency frontier, achieving a 15 percent to 30 percent distribution cost advantage over competitors while delivering equal or better service levels.

Some of these leaders go a step further and leverage successes in distribution optimization as a catalyst to improve performance across the entire value chain—from demand planning to logistics—both to improve the top-line and unlock additional savings.

We characterize the approach as "3D" outside-the-box thinking because it requires the following three dimensions: Benchmarking beyond industry boundaries, challenging preconceived views, and triggering a chain reaction in supply chain optimization.

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### 1) Benchmarking beyond industry boundaries

Solid distribution requires first establishing an accurate picture of your distribution competitiveness vis-à-vis true peers. The leaders establish a competitive gap assessment whereby they neither underestimate their distribution capabilities (devoting valuable resources without an adequate return on investment) nor overestimate their performance and thus get lulled into a false sense of complacency.

The leaders understand their true peer group and compare their distribution performance against these peers. Determining which companies are your true peers, however, can be difficult. It is not unusual to find after years of benchmarking that you've been comparing performance against the wrong peer group.

For example, a firm in the motor-vehicle sector we studied historically benchmarked its after-market distribution against the automotive industry and ranked its cost-to-serve in the top 90th percentile. But was this motor vehicle firm really performing in the 90th percentile? We didn't think so.

**Solid distribution requires first establishing an accurate picture of your distribution competitiveness vis-à-vis true peers.**

This company, like many others, was mistakenly defining its peer group largely by its overall business profile rather than by its after-market business requirements. When benchmarked against firms in other industries with similar distribution requirements—mid-scale apparel retailers and after-market parts firms—the company discovered that its distribution performance lagged well behind others.

Rather than rely on proxies for selecting a peer group for benchmarking such as "what industry do I play in?" or "who are my direct competitors?" distribution leaders use segmentation metrics to identify the correct benchmark peer group. The segmentation variables should have sufficient detail to (1) capture the key operational dimensions that characterize the underlying distribution requirements and (2) align with the

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company's overall business strategy as well as customers' needs.

### 2) Challenging preconceived views

In order to achieve breakthrough distribution performance, companies need to overcome entrenched biases. Often, organizational biases lead to sub-optimal decision making across two critical components of a distribution solution: determining the right level of technology and deciding on keeping distribution in-house vs. outsourcing (make vs. buy).

The right distribution solution thus requires an objective and systematic assessment of both components: technology and a make-vs.-buy assessment. Let's discuss each:

**Matching technology to requirements:** Distribution technology includes a holistic suite of warehouse automation, material handling systems and warehouse management system (WMS) software that collectively enables distribution, from product receiving to shipping. Determining the appropriate level of distribution technology—or whether or not you need it at all—requires considering several trade-offs, including capital investments, productivity, and longer term flexibility.

**Third-party logistics providers (3PLs), for example, can help reduce costs and allow companies to offer differentiated services.**

**Performing the make-vs.-buy assessment:** Distribution gaps can be closed by tapping into the external market for key capabilities. Third-party logistics providers (3PLs), for example, can help reduce costs and allow companies to offer differentiated services. Finding the optimal make-vs.-buy balance and then executing an outsourcing initiative requires adopting a strategic view. Before either dismissing outsourcing as too risky or embracing it as a silver bullet to achieve best-in-class competitiveness, systematically weigh the risks and the benefits. The three main questions to answer: Is product distribution a core competency? Is there a cost advantage to outsourcing? Is there a 3PL that could handle the job?

**Understand the 3PL market**


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**trends and capacity early:** Third-party logistics provider capacity must be understood at both the industry and individual levels. Performing a capacity assessment early on—before launching an official supplier bid process and due diligence—can save significant time and resources and better inform downstream bargaining power, which is crucial to capturing cost advantages from outsourcing.

**Recognize technology differentiation in the 3PL market:** Although all large integrated third-party logistics providers possess broad capabilities and can arguably play across the entire technology spectrum, many tend to have a technology "sweet spot." Rather than go with the low-cost or the most high-tech provider, look for 3PLs that have solutions and technology aligned with your distribution requirements.

**Look for 3PLs that have solutions and technology aligned with your distribution requirements.**

When considering a strategic fit in the due-diligence process, some questions to ask in this regard include: Are my distribution requirements and capabilities a focus area for the 3PL? How will my business affect the provider's overall revenue base? Is my industry vertical a key sector for the 3PL? Answers to such questions will not only provide a stronger bargaining position but also ensure that the 3PL continues to be responsive and flexible after the contract is signed.

**3) Triggering chain reaction in supply chain optimization**

Early successes in distribution can be a catalyst for change across the broader supply chain. Transformational change usually requires first getting past organizational impediments such as silos where key decision makers sit in different functions and there is very little collaboration among departments.

Focusing on a particular activity such as distribution can create a "wedge" to break down organizational and functional silos and drive broader transformation across the entire supply chain—from demand forecasting to inventory and freight management.

---

*–Joachim Ebert is a partner in the operations practice of A.T. Kearney and head of the firm's complexity management practice. He can be reached at joachim.ebert@atkearney.com. Kumar Venkataraman is a principal in the firm's operations practice and Michael Hu is a consultant in the firm.*

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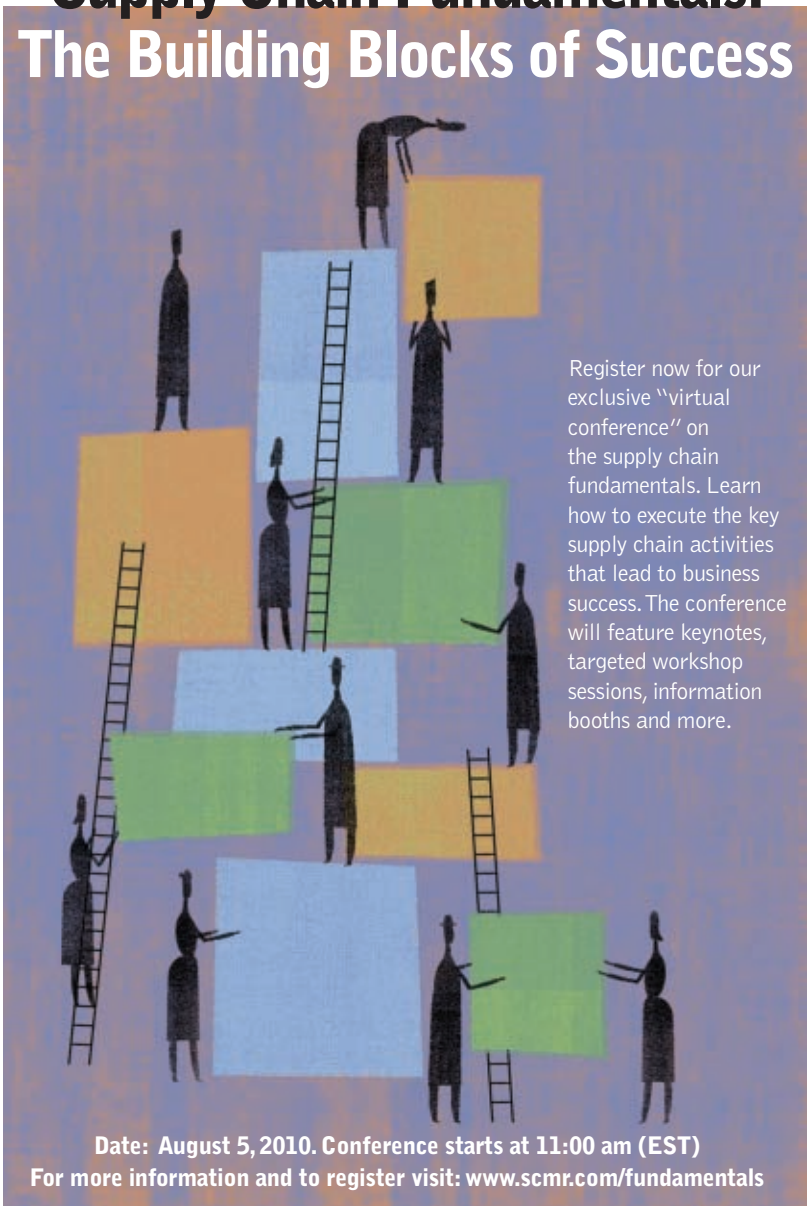

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SUPPLY CHAIN MANAGEMENT REVIEW

# The Impact of Education on Earnings Power

By Bridget McCrea

***In the supply chain field, there's always been a close correlation between education level and earnings power. In today's complex global environment, that link is stronger than ever.***

Based on recent findings, there's little question that education can have a profound impact on one's earning power. The phenomenon can be traced across today's workforce and in supply chain circles, where enhancing an educational portfolio often leads to better career opportunities, higher salaries and improved job satisfaction.

Indeed, experts are telling us that education has become even more critical in today's competitive job environment, where hundreds or even thousands of qualified individuals are vying for the top jobs. Analysts add that candidates who have real-world job experience combined with a strong educational background are very often the ones that stand out, get the first and second interviews, and are invited to join the company.

"All education is valuable, and looked upon positively by employers because it shows a passion for the business, and for increasing one's own value," says Rhoda Isaacs, president at Los Angeles-based executive search consultancy, R.I. James Inc.

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Learn more: www.bus.msu.edu/supplychain/msscm

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She sees MBAs as being particularly valuable for supply chain professionals, who are often asked to bring a mix of business, management, financial and supply chain expertise to the table. That expertise not only helps professionals tackle more complex projects while on the job, but it also helps them earn more money.

Citing a recent survey, Isaacs says MBAs earn an average of $232 more per week than someone with just a Bachelor's degree. That earning power takes hold early, says Isaacs. "MBA candidates from top schools who go into the programs earning $130,000 to $200,000 annually, typically see a significant salary increase—often over 100 percent—by the time they receive their degrees."

"Executives who want to increase their earning power really need to think about the kind of education and training that gives them the big picture."

*—Prof. Douglas Lambert, Ohio State*

## Is it Really Worth It?

Supply chain professionals taking the time to earn college degrees, advanced degrees and certificates, boast the highest salaries in their fields. According to the January 2010 *Logistics Management* Salary Survey, the average salary for a logistics manager right now is $103,003, while the median is $88,000. Forty percent of the salaries fall into the $100,000+ range, with 3 percent coming in above $250,000.

Of the survey respondents, 27 percent are involved in distribution/logistics; 20 percent in traffic/transportation; and 16 percent in supply chain management. Ninety-four percent of respondents attended college, where 73 percent earned at least an undergraduate degree. Nineteen percent hold MBAs, 35 percent have completed formal education in logistics and/or supply chain management and— among the latter group—32 percent have an undergraduate degree in logistics and/or supply chain management.

Informal executive education in the supply chain space is also popular among respondents. Of those managers who attended formal supply chain management training, for example, 44 percent did so at industry conferences, seminars and workshops, 43 percent via job-related training and 35 percent earned professional certifications. Thirty-two percent hold undergraduate degrees in logistics or supply chain management and 17 percent have graduate degrees in the discipline.

David MacEachern, a partner with executive search firm Spencer Stuart, Inc., in Miami, and manager of the firm's Global Transportation and Logistics Practice, says most companies look for university degrees—preferably in a logistics discipline—when hiring new supply chain professionals. For senior supply chain roles, says MacEachern, an MBA is often required.

Credit the increasingly complex nature of the global supply chain with driving that demand for higher degrees and logistics expertise.

"Companies are looking for broader business skills in addition to the more specialized knowledge of logistics and the supply chain," says MacEachern. "These types of job positions touch on so many aspects of a company's operations, and require stronger business and general management skills than ever before."

## By the Numbers

Supply chain professionals aren't alone in feeling the positive effects of higher education. In fact, education equates to higher salaries in nearly every corner of the workforce. The U.S. Census Bureau conducted an in-depth study some years back, examining the relationship between education and earning power. The findings show that the more education an individual has the more money he or she made. Earnings ranged from $12,809 for high school dropouts to $74,560 for those with professional degrees.

According to the U.S. Census, high school dropouts will earn about $600,000 during their lifetime, while high school graduates would take home an additional $200,000. Those attending college (but not earning a degree) would earn $1 million, with another $500,000 tacked on for someone who earned a Bachelor's degree. Doctorate and professional degree holders would take home $2 million and $3 million respectively.

In supply chain-related fields, MacEachern says top earners typically include professionals who earned non-logistics-related undergraduate degrees (and learned through their employers' development programs) and those who came into the field already armed with advanced degrees in supply chain management and logistics. He sees the former as a particularly popular track for new entrants into the field.

"Someone could graduate from a university with a business degree, slide right into a job with a PepsiCo or Frito-Lay, and get into the firm's supply chain and logistics devel-

opment program," says MacEachern. "In my mind, that would trump just having a degree."

While a logistics degree is an excellent tool, he adds, "it's just one ingredient in the cake, and just having the degree itself isn't enough to open the doors and make the cash roll in."

Isaacs sees logistics-specific education as an advantage for supply chain professionals. The recruiter believes that such knowledge—when added to business management and financial expertise—can be a potent combination for someone looking to boost his or her earning power. "Years ago there was no such thing as a supply chain or logistics degree, but that's changed," says Isaacs. "These days, my clients are always interested in job candidates who have logistics education and/or experience."

One of several universities answering that call from employers is Ohio State University's Fisher College of Business, where Douglas Lambert holds the Raymond E. Mason Chair in Transportation and Logistics and serves as director of the university's Global Supply Chain Forum. He says the institution's undergraduate, masters and PhD programs in supply chain/logistics attract a wide range of professionals from job functions like purchasing, logistics, operations, marketing and sales.

When it comes to measuring the impact of education on those professionals' earning power, Lambert says "many people get the bulk of their real-world experience [by working] within a business function." Most of that experience is vertical in nature, he remarks. A business school graduate works his way up from tax and audit work to vice president of finance over a 25-year period, for example. Lambert sees opportunity in making that experience more "horizontal," to ensure that professionals "don't solve one problem, and then wind up creating more."

It's those horizontal thinkers who will wind up with more compensation than their more narrow-minded counterparts, the educator says. "Executives who want to increase their earning power really need to think about the kind of education and training that gives them the big picture," says Lambert, "and the kind of cross-functional experience that is desperately needed in both the private and public sectors."

## Taking the Plunge

It's hard to ignore the indicators pointing to undergraduate, specialized and advanced degrees as vital components for a supply chain professional's portfolio. Add the myriad supply chain certifications and executive education options to the list of choices that can help professionals win new job titles, earn more money and enhance work satisfaction.

Getting there isn't always easy in today's society, where seasoned supply chain professionals often have other obligations that prevent them from devoting the necessary time and resources to their educations. "A lot of these folks are at points in their lives where they have a lot going on with work and children and everything else," says MacEachern, "but if they want to get to the point where they can leverage their educations to increase their earning power, they have to just jump in and do it."

There's no time like the present, says MacEachern, particularly for those current or aspiring supply chain professionals who are lacking the expertise, knowledge and education possessed by recent college graduates. As the latter use internships and other methods of gaining real-world experience, they will present significant competition for anyone who may have ignored the educational component early in his or her career.

"Looking five to 10 years out, we expect more companies looking for MBAs when hiring supply chain executives and managers," says MacEachern. Rhoda Isaacs of R.I. James concurs, noting that the value of MBA and Executive MBA degrees in the supply chain field should increase steadily going forward. As that value is conveyed to employers, expect it to translate into higher salaries and enhanced benefits packages, she says.

"Companies are willing to make the investment in managers who have high potential because they view these people as critical additions to their businesses," says Isaacs. "When they see someone who has increased his or her professional capabilities and education, they notice a person who can effectively plan, work on a team, exchange ideas and innovate."

For the job seeker who is hitting roadblocks in the search for a logistics or supply chain position right now, plumping up that "education" portion of your resume is a step in the right direction. "There are lot of people out there currently who are unemployed, doing consulting work and looking for jobs in the field," says Isaacs. "Anything you can to do stand out—from online courses to executive education to advanced degrees—will go a long way in enhancing your value in the eyes of the employer."

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*Bridget McCrea is a free-lance writer specializing in logistics and supply chain management. She can be reached at bridgetmc@earthlink.com.*

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# Supply Chain Education Programs

## Universities and Educational Institutions

### American Public University System (APUS)

1-877-755-2787 www.apu.apus.edu

APUS offers online B.A. and M.A. degrees in Transportation and Logistics Management for (1) serving military transportation logisticians, transportation personnel, or related specialists (2) government or corporate civilians involved in the transportation industry, and (3) individuals interested in entering the transportation industry. APUS' degrees build knowledge in transportation, logistics and supply chain management by providing students with the principles of management, economics, finances and components of global air, maritime, logistics and transportation systems. Students learn cutting-edge processes of IT, security and intermodalism.

### Arizona State University

W.P. Carey School of Business
480-965-7579 www.wpcarey.asu.edu/exec

Fall programs include:
Sustainable Supply Chain Management
September 3-10, 2010

Closed-Loop Supply Chains (online)
September 10-17, 2010

Operations and Supply Chain Management (online)
September 13 through October 17, 2010

Graduate course:
September 13 through October 24, 2010

### Brigham Young University

Marriott School marriottschool.byu.edu

University offers a B.S. 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 Online

877-268-4636 www.cel.cmich.edu/onlineMBA
muoffcampus@cmich.edu

Central Michigan University offers an MBA degree with a concentration in Logistics Management. This program provides a solid foundation in business administration and finance plus a hands-on applied knowledge of logistics management. The online MBA program is taught completely online with degree completion in two years. It is AACSB accredited.

Central Michigan University Online also offers a graduate certificate in Logistics Management. This program includes four courses and a final project, and is designed to enhance current skills or position the student for a new career in logistics.

### Cranfield University/School of Management

44-011-1234-758102 www.cranfieldmsc.biz/log

University offers an MSc in Logistics and Supply Chain Management. Two modes of study are offered: Full time programs (11 months) and Executive (part-time) programs, which are two-year modular programs.

### Georgia Institute of Technology

Executive Masters in International Logistics (EMIL)
404-385-2538 www.emil.gatech.edu/

The Executive Master's in International Logistics & Supply Chain Strategy Program prepares executives from the world's leading companies to face a multitude of 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 unique 18-month masters program keeps key employees on-the-job while teaching them practical techniques for decreasing logistics costs and improving supply chain efficiencies across the globe.

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 worldwide.

### Georgia Institute of Technology

Supply Chain and Logistics Institute (SCL)
404-894-2343 www.scl.gatech.edu

SCL offers a comprehensive curriculum in supply chain and logistics operations management and technology. Provides two-day to five-day courses for in-depth knowledge on specific topics. SCL also offers a multi-course certificate program for comprehensive supply chain education. Online course are available. Please see website for a comprehensive listing.

SCL also offers a lean supply chain professional certificate. This three-course series is the first certificate program of its kind. With a focus on building the lean supply chain professional, this program will change how supply chain professionals think, act, and lead by teaching them to develop and implement strategic and tactical elements of lean supply chain principles.

### 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 in 15 months.

## Massachusetts Institute of Technology (MIT)

Center for Transportation and Logistics
617-258-7267 ctl.mit.edu/

MIT CTL's four-day program for supply chain executives and management teams, *Supply Chain Management: Driving Strategic Advantage,* offers a combination of hands-on exercises and simulations, case studies, and highly interactive sessions developed by MIT for this unique course. Expert speakers present the tools, models, and business processes needed to manage today's complex global supply chains. Participants will explore new ideas in supply chain integration, and learn how excellence in supply chain management yields business success.

## Michigan State University

Broad School of Business
517-355-8377
www.bus.msu.edu/supplychain/msscm

The Master of Science in Supply Chain Management (MSSCM) degree program at Michigan State University offers 19 classes in a unique format for working professionals. An example of a few of the classes:

*MSC 870 Introduction to Logistics and Supply Chain Management (3 Credits)*
Integrated view of procurement, operations and logistics management. Management of the flow of products from raw material sourcing and acquisition through delivery to the final user.

*MSC 872 Distribution Fulfillment (2 credits)*
Management of the firm's value creation process from product development through order receipt and delivery to consumer. Alternative approaches to developing customer value and the role of the demand and supply chain in providing it.

*MSC 874 Total Quality Management and Lean Enterprise (3 credits)*
Total quality management principles, practices, and techniques. Implementation of quality improvement programs. Relationship to manufacturing and competitive strategies.

*MSC 877 Supply Chain Management Information Technology (2 credits)*
Role of information technology in logistics and supply chain management, planning and operations. Requirements, capabilities, and considerations for using IT applications in logistics.

*MSC 848 Analysis of Supply Markets and Supplies (2 credits)*
Methods for supply market analysis to support sourcing strategy development, contract negotiations and cost management initiatives. Analysis of supply market conditions.

*MSC 883 Supply Chain Integration and Strategic Agility (2 credits)*
This course will expose students to ideas pertaining to supply chain integration, strategic sourcing, relational norms in buyer-supplier relationships and strategic agility in supply chains.

*MSC 879 Supply Chain Management – Strategy and Applications (3 credits)*
Analysis and solution of SCM cases and simulations. Teamwork, communication and job skills. Situations involving purchasing, manufacturing, logistics and transportation as an integrated supply chain.

## 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
866-890-0347 x3510 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

## 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 new specialized program, Masters in Business Logistics Engineering (MBLE).

The Fisher College also offers an executive seminar on key supply chain processes, such as customer and supplier relationship management, demand management, order fulfillment, returns management, and more.

Supply Chain Management
October 11-15, 2010
Cranfield, England, In collaboration with Cranfield University

Supply Chain Management
November 1-5, 2010
Fisher College of Business

## Penn State University

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

Fall course offerings include:
Applying Lean Principles Across the Supply Chain
November 1-5, 2010

Designing and Leading Competitive Supply Chains
September 19-24, 2010

Essentials of Supply Chain Management
October 4-8, 2010

Processes and Tools for Supply Chain Success
November 15-19, 2010

Achieving Supply Chain Transformation
September 13-17, 2010

Developing World-Class Supply Chain Collaboration August 23-26, 2010

Global Supply Chain Strategies
October 26-29, 2010

## Rice University

Jones Graduate School of Business
(713) 348-6060 www.business.rice.edu

Executive education program offers a wide range of open enrollment and custom programs.

## Rutgers University

Center for Supply Chain Management
(973) 353-1169 www.business.rutgers.edu

The Rutgers Center for Supply Chain Management offers bachelors, masters and doctoral programs in supply chain and logistics Also offers MBA with a concentration in supply chain management.

## Stanford University

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

The Graduate School of Business is offering a new 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 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.

## 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.

## 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.

## University of Michigan

Ross School of Business
734-763-7804 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/msscm

The University of San Diego's web-based Master of Science in Supply Chain Management (MS-SCM) is designed for high-performing managers and executives who have an established track record of success in one or more of the functions included in supply chain management. The online program allows students to study wherever they are located while giving them the opportunity to come to San Diego three times a year to interact with faculty and co-learners. The program is approved by the Institute for Supply Management (ISM).

## University of San Francisco

800-609-4196 www.usanfranonline.com

USF offers an online interactive Master Certificate program for Supply Chain Management.

## University of Tennessee

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

The Integrated Supply Chain Management Program gives students 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. Program is composed of six, two-and-one-half day courses. These courses consistently have been ranked among the best in the field.

Supply Chain Management Strategy
August 23-25, 2010

Demand Management in the Supply Chain
August 25-27, 2010

Logistics and Operations in the Supply Chain
November 15-17, 2010

The Lean Enterprise and the Supply Chain
November 17-19, 2010

Performance-Based Logistics:
September 14-17, 2010

Vested Outsourcing
October 26-28, 2010

### University of Wisconsin-Madison
Executive Education Center
608-441-7357 exed.wisc.edu/supplychain

Fall course offerings include:
Supply Chain Leadership, June 21-23, 2010

Supply Chain Optimization, September 9-10, 2010

Supply Chain Collaboration, October 21-22, 2010

### Walden University
866-492-5336 www.waldenu.edu

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 Institutions

### APICS (The Association for Operations Management)
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.

### 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. Features an annual Conference and Educational Exhibit. Also provides in-depth research on supply management topics through affiliation with CAPS Research.

### 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 Transcom 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.

### 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.

### TRB (Transportation Research Board)
202-334-2000 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 three-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 demonstrates the benefits and synergy of CPFR with other company initiatives such as category management and sales and operating planning.

### WERC (Warehousing Education & Research Council)
630-990-0001 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.

## Private Firms

### Accenture
Supply Chain Academy, New York, NY

www.supplychainacademy.com

Accenture Supply Chain Academy offers a large library of supply chain courses online as well as certification programs.

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