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Supply chain management is all about software and systems, right? Get the best technology in place, then sit back and watch as your processes run smoothly and the savings roll in.

If that's true, then why did Jeff Bezos raid Wal-Mart's bench, paying top dollar to bring best-in-class logistics expertise to Amazon? Supply chains, it seems, are really about talent, not technology, especially as the marketplace grows ever more complex. But how to get people to work together?

It's not easy. When *Harvard Business Review* recently convened a panel of leading thinkers in the field of supply chain management, people and relationships were the dominant topics of the day. Creating effective alliances between companies, for instance, is complicated. Purchasing managers are rewarded for wringing the best possible price out of suppliers—a practice that's not conducive to nurturing long-standing partnerships. Internal relationships can be even more difficult to manage, according to one of our panelists. We've long known that functional silos hinder communi-

cation and efficiency, but many companies still struggle to tear down the walls.

Our panel, led by HBR senior editor Julia Kirby, explored these and such other obstacles and opportunities in supply chain management as developing talent, the role of the chief executive, and the latest technologies. The few companies that have cracked these nuts are gaining ground: The gap between the supply chain leaders and the average performers is large and growing. The following is an edited transcript of the panel's conversation.

Julia Kirby: I suspect that priorities in supply chain management have changed quite a bit in the last couple of years, for a variety of reasons. There's the economic downturn and the plunge into overcapacity. There's also terrorism and war. So I'd like to start by asking, What are the priorities today? Has your focus changed?

Chris Gopal: One area that's quite different from what it was a few years ago is, of course, security. The government has imposed, and is in the process of imposing, new regulations

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—William Copacino

and requirements, particularly on companies doing business overseas, and a lot of them are not prepared for it. We've all heard about the stories of a ship being held up at a major port—at Long Beach, California, say—because it's got cargo that has set off alarm bells.

Another current priority is getting the tools we need to create an adaptive and responsive supply chain strategy—which is important because most supply chain strategies start down the road to being obsolete almost as soon as they're published. Creating an adaptive strategy starts with modeling the supply chain and doing scenario planning. That allows you to more effectively manage risk and cope with changes and uncertainty in the market, which in turn increases cash flow and customer retention. And then, once you execute your strategy, you need to be able to redo it based on patterns and trends derived from real-time information. Companies need tools for this kind of continual innovation—and there are none today.

Sandra Morris: A big shift for Intel has been globalization. Our customer base is changing dramatically, not just in terms of where they live but also who they are and how they operate. There's huge potential in China, for example, and growing markets in Russia and India.

That drives a different type of supply chain requirement. For example, the companies that are building and shipping PCs in emerging markets are small resellers, small distributors, not the typical multinational corporation we've worked with for decades. Their needs are different.

William Copacino: If you think back three to five years, the major issue for many companies was not to run out of parts. Today we have significant global overcapacity in most industries. So a key issue is managing the supply base—including sourcing, supplier integration, and in-bound parts management.

I also see a shift in focus from planning to execution. But I personally believe that there are huge opportunities on the planning side—in matching supply and demand. People are missing out because their attention, frankly, is so focused at the transactional level. We are seeing a shift back to basics—to MES [manufacturing execution systems] and WMS [warehouse management systems].

And we are beginning to see a growing interest in radio frequency identification—RFID—for several reasons. The cost of both chips and reader-writers is coming down rapidly, so the cost of solutions is becoming more competitive; the capabilities are expanding; and the need is growing in areas like theft protection and security.

Scott Beth: A big issue for us is misalignment of materials technologies and product life cycles. Say you're building instrumentation products that will last ten to 15 years using semiconductor components and other

The panelists (Alphabetical order)

Scott Beth is the vice president of procurement at Intel. At the time of the roundtable, Beth was a senior director of global sourcing for Agilent Technologies' electronic products and solutions group.

David N. Burt is a professor of supply chain management and the director of the University of San Diego's Institute of Supply Chain Management.

William Copacino is the group chief executive of Accenture's Business Consulting capability group. He is the author of several

books on supply chain management, including *Supply Chain Management: The Basics and Beyond* (St. Lucie Press, 1997).

Chris Gopal is the vice president of global supply chain management at Unisys. Previously he was the director of global supply chain consulting at Ernst & Young and a vice president at Dell Computer.

Hau L. Lee is the Thomas Professor of Operations, Information, and Technology at Stanford University, codirector of the Stanford Global Supply Chain Management Forum,

and director of the Managing Your Supply Chain for Global Competitiveness Executive Program.

Robert Porter Lynch is the CEO of the Warren Company. He is the author of *Business Alliances Guide: The Hidden Competitive Weapon* (Wiley, 1993).

Sandra Morris is a vice president and the chief information officer of Intel, where she has been since 1985. Previously, she was at the David Samoff Research Center of RCA.

materials that may be available in the market for only 18 to 36 months before they're discontinued. This situation presents me with three alternatives: I have to buy and store a 13-year supply of components—that's a lot of extra inventory. Or I'm forced to mortgage the future by pulling engineers off new product development to reengineer products that still have a life in the marketplace. Or I have to find brokers or others who are willing to take the risk of holding onto unique and rapidly aging parts.

Kirby: I'm struck that I'm not hearing you say, "Three years ago, the whole point of supply chain management was to increase speed, and now we're totally focused on cost reduction." Is that not happening?

Robert Porter Lynch: To some extent, it is. The most disturbing trend that I've seen, with the meltdown of the stock market, has been cost cutting as a knee-jerk reaction. A chief financial officer will call the supply officer and say, "Cut costs 15%; we've got to get our stock price up." That knee-jerk reaction is having wholesale effects throughout the supply chain in very negative ways. You start to see cost cutting become a substitute for much more important competitive-advantage issues. A principle in business is that you cut costs to survive, but you innovate to prosper.

Beth: We're under incredible pressure to reduce material costs. But just as much on my mind is dealing with suppliers who aren't going to make it through this business downturn—many basic-component manufacturers are going out of business. When you're relying on a partner for unique technology, what do you do when they say they're locking their doors next week? How do you (a) find another source and (b) predict the health of suppliers so you can anticipate a shortfall before it happens?

Hau L. Lee: Cost is important, and so is speed. But I and my colleagues have been studying companies that have been hugely successful in the long run. And we've discovered that those companies are great not because they were focused on cost or flexibility or speed but because they have the ability to manage transitions—changing market conditions, evolving technology, different requirements as a product moves through its life cycle. The companies that can adapt are, I think,

"A principle in business is that you cut costs to survive, but you innovate to prosper."

—Robert Porter Lynch

the ones that will be here for the long term.

These days, companies also need to be able to handle one more type of transition, which is crisis management. Successful companies have been able to grab market share and sales out of crises, which often requires them to work effectively across functional boundaries. I cite you the example of Zara, a Spanish apparel company. After September 11, which was, of course, a time of mourning, this company was able to get its designers, supply chain partners, and manufacturers together and in two weeks launch a new line of apparel featuring the color black. They got a tremendous sales lift as a result.

Companies like that have what I call the triple-A supply chain. They have agility, adaptability, and alignment. You need to align the interests of the functional groups and multiple partners so that you will be able to move forward in unison.

Kirby: But we've known for 15 years that functional silos get in the way. Are the barriers starting to come down at all?

Lee: I still find many big corporations where each of the different functions do not know what the others are doing. A company might have promotion plans or a special trade deal in place, and the supply chain people are unaware of it. Or the supply chain manager plans how much inventory to put in place or how much capacity to invest in and doesn't share that with the sales and marketing people. And so you may find yourself in a situation where the sales and marketing people are giving special deals on a particular product when, in fact, you're running up to the capacity limit.

There are a lot of great examples of this disconnect. The most celebrated is Volvo, which made a lot of green cars in 1995 and wasn't able to sell them. So the sales and marketing people started to secretly offer heavy discounts, rebates, and special deals on green cars to their dealerships. The supply chain people didn't know that, and when they saw the green cars selling, they doubled their production plan for them for the next year. Volvo had a lot of green cars at the end of that year.

"When you're relying on a partner for unique technology, what do you do when they say they're locking their doors next week?"

—Scott Beth

Morris: We've created a capability—five people, very senior program managers, who can look horizontally across functions. They bring together executives or senior managers and facilitate discussions about the tensions between product division goals, supply network goals, and customer goals. We have lots of people who are deep in their silos. They're also really smart. So getting them together on a fairly regular basis to deal with strategic topics in a facilitated session has been a breakthrough for us. It's probably been one of the best investments we've made.

Lynch: Here's a data point. I'm the chairman emeritus of the Association of Alliance Professionals, and we did a survey last year of the critical issues concerning strategic alliance professionals throughout the world. We have 800 members. The number one concern these professionals had wasn't creating strategic alliances with other companies but creating alliances internally between the silos of their own company. For some reason, alliance professionals typically find it easier to create alliances with their major competitors than with other divisions in their own companies. We don't deal with our own internal integration. How do we integrate externally if we can't do it internally?

Gopal: Way back in 1980, some studies were done as to why MRP [manufacturing resource planning] systems failed in implementation. One of the key reasons was this concept of silos, individual departments with their own metrics. To illustrate this, they came up with something called the Beer Game, in which you simulate a sudden change in demand and need to get your supply chain back into equilibrium. So now I'm sitting here in 2003 listening to exactly the same point and exactly the same comment about what makes these relationships successful. Has anything changed? Are we still dealing with the same problems in different forms?

Copacino: Some companies are. But I think there's been a tremendous bifurcation of performance. In almost every industry, supply chain has become a much more important strategic and competitive variable. It affects all

of the shareholder value levers—cost, customer service, asset productivity, and revenue generation. Yet we are seeing a growing gap in performance between the leading and the average companies. The best are getting better faster than the average companies across almost every industry. For instance from 1995 to 2001, Wal-Mart improved its inventory turns from 5.23 to 8.34. Its nearest competitor over that same time moved from 4.01 to just above five inventory turns, not even to the point where Wal-Mart started. And Dell operates with 64 to 100 inventory turns, more than two or three times most of its competitors. So, clearly, the performance gap is widening, and we see this happening in almost every industry segment.

The leading supply chain performers are applying new technology, new innovations, and new process thinking to great advantage. The average-performing companies and the laggards have a limited window of opportunity in which to catch up.

Kirby: Robert mentioned that companies are having an easier time with external alliances than with internal ones. How are those external relationships evolving?

Lynch: The best companies I see are beginning to triage the supply chain. In other words, they'll separate vendors that provide commodities from preferred suppliers that they have good relationships with from strategic suppliers that they create alliances with. They manage the supply base through those three different elements in very different ways, using different metrics, different processes, different people, and different mentalities.

Beth: Absolutely. I think that we have to determine, in Intel's case, where contract manufacturers fall along that spectrum. Speaking frankly, I think there's a love-hate relationship between OEMs and contract manufacturers. People don't trust the pricing they get, or there's a sort of bait-and-switch approach, where your prices start out low and then begin to creep up.

Kirby: David, I see you nodding at this reference to trust. I know that issue is dear to your heart. What can you add?

David N. Burt: Trust is the basis of agility, of flexibility. Yet it's an incredible challenge to es-

establish trust and maybe even harder to maintain it. Underlying the challenge is the question of how to institutionalize trust between buyer and supplier. I've got colleagues who maintain that trust can only be established between individuals. But a few souls like Robert and myself say we've got to be able to institutionalize trust. We've got to make it work so that when the founders of the alliance depart, the alliance continues. We've been looking at this at USD for over ten years, and we don't have the answer yet.

But it's important. As the world gets more complicated, when I sell a product, I may be selling a solution that requires input from four or five companies. How do they get along with each other? If suppliers don't trust each other, the customer will be whipsawed. Also, trust enables you to make fast decisions, which lets you be more innovative and get rid of unproductive work. Trust is a competitive advantage.

Beth: You also lose out on efficiencies when trust isn't there. A lack of trust causes companies to duplicate activities between its own operations and its outsourced partners. Too often, we outsource an activity and then keep a lot of the management systems for that activity in place to verify that certain things are being done.

Lee: The way to build trust and establish a harmonious relationship is the third A of my triple-A: alignment—align the interests of the multiple parties so that they have some common values and goals.

A good example of alignment comes from Saturn. Saturn recognized that to provide good service in terms of the end customer's experience, it wouldn't be enough to be good at replenishing and supporting dealerships, which Saturn calls "retailers." The retailers also needed to have the right inventory. But Saturn understood that the retailers weren't necessarily good at inventory planning and forecasting. So the company asked retailers to let it take over the job of inventory management, and in return it offered to share their risk. If you're out of stock, Saturn will get the part to you from another retailer, overnight. Saturn even measures its own employees on how well the retailers serve their customers, the end users.

The result is that Saturn is always ranked among the top three in J.D. Power's Customer Satisfaction Index, even though it's competing

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—Hau L. Lee

with luxury cars. And Saturn retailers have a superior inventory performance—its average dealer inventory turn is about 7.5 a year versus the industry average of 2.5. Everybody wins when you have the right alignment.

Gopal: I'd like to add a slightly different perspective. Trust is essential, of course. But before trust comes smart contracting. Trust is predicated on doing things jointly and in an aligned fashion over a period of time with no major surprises. However, to start with, the supply chain folks, who know the environment and the potential risks, need to get together with the people who develop the contracts so that managing risk—planning for alternative scenarios—can be embedded in the strategy and the contract. The next step is metrics. Trust can only be engendered by considering the risks and having joint metrics, with penalties and incentives. And over time, trust develops. I know that Scott does a lot of work in managing risk, working with different types of contracts with suppliers to generate some of that trust. Scott, do you have anything to tell us about this?

Beth: Our expectations for suppliers are changing. In the past, the contract manager would put a contract in front of me and point to a 3% price reduction over last year. The vector is right, and it's my only choice, so I'd sign off on it. But now what I expect is a series of choices that trade off price, inventory, and responsiveness. Those are the kinds of trade-offs that I need to be able to think about.

But on the issue of trust and penalties: We started off with a penalty approach, a clause that says if you don't provide us with a certain level of responsiveness, we'll charge you. And that began to erode trust. So instead we created an escrow account. If either party violates the agreement, money goes into the account, which is then used to reinvest in the relationship—new information systems, joint team education, and travel to get our people together more often. The level of trust went way up when we took this change in perspective.

Burt: These types of contracts and processes are critical. A company in our benchmark study—a large consumer products company—

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buys, for example, enzymes for its soap from a small company in Denmark. There are numerous intellectual property issues related to developing new chemical enzyme technologies, so naturally there are concerns about sharing ideas. The two companies worked out master agreements ahead of time so that they could develop and share new technologies without always having to go back to the lawyers and sign new legal agreements. They both placed a great deal of emphasis on ethics and had a clear understanding about the procedures, about what was expected from whom. The relationship was so good, and Natalie, the supply chain manager from the American company, fought so hard within her company on behalf of the supplier, that the Danish company named its latest enzyme Natalie for her.

So the relationship counts, but so does the process. They had a clear process governing how to work together, which allowed them to be constantly innovating and kept the relationship healthy.

Morris: I agree that good contracts are absolutely essential, but we've also seen that you can develop trust over time by increasing access to information and to experts within the company. That's particularly been the case with our e-business efforts, such as automatic replenishment of the factories. It starts with a pilot, with one trusted supplier, and it grows over time to become the standard way we do business.

We've watched the same kind of relationship grow among suppliers as we've created information repositories for fabrication equipment. When we develop a new technology, we work for years and years with both our customers and our suppliers before that technology is available, so products exist that use the technology when it's ready to ship. That sometimes involves a number of suppliers sharing information with each other as well as with Intel. The process, which began with three or

four people who were willing to take that risk with us—to be fellow travelers—has now become a common way that we exchange information and develop new products.

Lynch: Picking up on the idea of sharing with your partners in the value chain, there's an avenue of innovation that's just being completely missed, which is innovations that come from your suppliers. Dr. Bart did a study on this; I believe it was last year. And I think the average company said that 35% of its innovation came from the supply chain. Now, ask yourself, is that enough? Companies like Toyota are getting 60% of all their innovation out of the supply chain.

Here's a story. A client told me, "My largest customer is Johnson & Johnson. Every year, they come to me and they want a 5% to 15% price cut. I have piles of innovation to bring them. Every time I ask the supply chain manager, 'What about my innovations? Where do I take them?' He says, 'I'm not interested in that.' Why not? Because he's not rewarded for innovation. He's rewarded for cost cutting."

Another example: If you look at General Motors during the 1990s, warranty costs were higher than profits. Why were warranty costs so high? A lot of it is because GM wasn't looking to the supply chain for innovation. Chrysler, meanwhile, took massive amounts of market share because it was taking innovation through the supply chain. So, the question is, Do we prize it? Do we even measure it? Do we recognize the impact of supplier innovation on our competitive advantage? On customer satisfaction?

Gopal: I'd like to go a level below all of that and say the companies I've seen that innovate best in the supply chain seem to be those that actually have the excellent people focused on the supply chain. I think it's a people issue, an issue of senior management focus and will. Michael Dell and his senior executives used to attend demand/supply-matching meetings. Dell executives are measured on joint metrics—they are (or at least they used to be) all measured on the same things—and that drives their focus on the supply chain as a competitive weapon.

Somebody once asked me about best practices. Well, knowledge is free. Everything that Dell, Wal-Mart, and 7-Eleven do is available somewhere on the Internet. Yet how many people can actually execute on it? The key is

putting the system together right and making sure it works—managing risks and planning for contingencies through scenario planning, then executing and changing the strategy based on real-time trends.

Somebody also asked me about worst practices. I think the absolute worst practice is equating technology with the supply chain—the idea that “I buy a technology, so I’ve got a great supply chain.” Nonsense. Innovation comes down to the people, the tools, and what value senior management places on it. I’d like to ask Hau, How many students at Stanford go into management of the supply chain?

Kirby: I think a lot of people woke up to the talent component of supply chain management when Amazon quite visibly and famously raided Wal-Mart’s supply chain management talent. That was a surprise to a lot of people who thought supply chain was mainly about technology and how much money you spent on distribution center design and the like. But is it really about talent, Hau?

Lee: I agree that people—and in particular the leadership—are a very important part of supply chain management. Toshifumi Suzuki, the chairman of Seven-Eleven Japan, spends a whole morning each week reviewing the previous week’s supply chain performance. It shows his passion, and it shows his commitment and interest.

In terms of our students at Stanford, electives on supply chain used to be unpopular, but now we have to offer more sections. I know my colleagues at other schools are seeing the same thing. And it’s because we have companies like Dell, Seven-Eleven Japan, and Zara that are hiring talented people and giving them opportunities for a great career path, showing them that supply chain is not about just managing within these four walls. And the difference is not in cost containment but in innovation and value creation.

Kirby: Scott, are you seeing that? Is your talent pool rising?

Beth: Yes. When I meet with a group of procurement professionals, I ask them about their backgrounds. In the past, I got primarily teachers, real estate agents, accountants, administrators, political scientists, sometimes a lawyer or two. Now I’m finding the population shifting toward supply chain professionals, people

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—David N. Burt

who are coming with that training.

Kirby: So talent is key. But what about technology? Is it not as fundamental as some people believe?

Burt: There are two schools of thought. One is that by getting the right software we can get rid of people. It’s that simple. The other is that IT and other technologies are enablers, and they can be tremendous assets when you have the right people in place. But if your CEO or CFO thinks that you’re going to get rid of people because you bought whatever software, I’m not sure it’s a place you want to work.

Morris: Some amazing information technology has arrived on the scene, RosettaNet being one in the PC supply chain. It’s a story of incredible cooperation among competitors—400 companies got together to define business processes at a pretty tactical level. How do we treat an order? How do we treat a return? How do we treat an advance shipping notice? What fields do we need so that we can have machine-to-machine communication, allowing a distributor to connect to 35 suppliers and not have to create point-to-point business processes and reconcile data on the back end on a daily basis?

Last year, we did about 10% of our transactions with customers using the RosettaNet standard. I don’t think it will completely replace EDI, but we think over time it will become a standard way for us to connect, for certain types of transactions. It’s more efficient, not because we think we can lower head count but because we can get people out of the day-to-day business of reconciling and touching purchase orders that should never be touched and get them to focus on higher-order service and strategies for the company.

Lee: Technology—hardware as well as software—is without question crucial in supply chain management. But technology can break the company as well as enable the company to be hugely successful. The distinction is in how people use their technology. Technology is an

"Trust is essential, of course. But before trust comes smart contracting."

—Chris Gopal

enabler. You can turn it into power and then receive C-level attention. It depends on the people.

Copacino: One of the critical findings out of our research was exactly that: The masters—the leading companies—are extraordinarily good at selectively choosing what technologies to implement. Others—the average-performing companies and the laggards—are broader and less selective in deciding what technology solutions to implement. And the masters are very disciplined in their implementation, focusing on process design and effective program management and change management.

Lynch: I would add that companies are much more cautious now about technology because there were so many implementation bumbles that drove companies up the wall. They are now much more careful to make sure that an implementation is going to go according to plan and it's going to meet the company's needs. Whereas three or four years ago, so many companies were implementing technology willy-nilly because they thought it was a cure-all.

Kirby: What about RFID? Is it real? Is it overhyped? What's the ROI horizon?

Copacino: We have seen a significant pickup in interest and successful pilots over the last six months. As prices come down, with chip prices that are now approaching 20 cents and will over time go to five cents, RFID becomes very valuable from a productivity point of view. Price points are coming down on reading equipment, too.

We are actively working on probably nine or ten applications, particularly in areas where there's concern about theft. But, more fundamentally, we're also seeing broader efficiency and operational improvements over traditional processes, methods, and technologies.

Gopal: The application is everywhere. Retail is one. Ford uses a real-time logistics system for visibility through triangulation. Container people use it for tracking. And I think, with Operation Safe Commerce, now it's going to be even more in demand. Adoption will go

by industry. Five cents is a good-enough price point for some heavy industrial manufacturing. One cent will be good enough for very low-margin consumables, maybe. It's a question of economics and end-to-end visibility.

Lee: I think RFID will evolve much as e-commerce has evolved. When e-commerce first came out, it just automated existing processes and work flows. You could send a purchase order by the internet or pay an invoice or communicate through e-mail. You were substituting an existing technology for a new one, but you were doing the same thing.

That's not the biggest impact of e-commerce. As Sandra described, the biggest value comes when you can do things like collaborate with your suppliers, as Microsoft did when it used the Internet to collaborate on the design for the Xbox. And you can also use e-commerce to change a process. For example, e-commerce can allow manufacturers to ship products directly to consumers, bypassing multiple layers of distribution channels. It's the process changes that create the greater value.

RFID will follow the same kind of evolution. Now it's mostly tracking. Instead of physically counting how many items you have on the shelf, the technology can read it, and you know instantly. You want to find out when an item left the store? You know instantly. This is automating an existing process that you're currently doing manually. That's the first level but not the biggest impact. I think the biggest value will come from new applications that use the technology's intelligence. RFID can create a borderless supply chain when cargoes are equipped with tags showing the contents, so that customs clearance can be done almost automatically. RFID can also provide supply chain security when RFID tags are used to electronically seal containers and monitor movements of the containers, so that any tampering can be tracked.

Kirby: I have one more question, which touches on a number of things we've talked about today—sharing information with customers and suppliers, developing alliances, innovating with suppliers. My question is, When do we stop talking about the supply chain and start talking about the value chain?

Lynch: The problem with value chain is that most people haven't really started to think about it. It's not taught in the university;

we don't have a value chain professor. It's like strategic alliances: It sort of grew organically. But in many industries, the leaders actually have shifted from supply chain to value chain, even if they haven't branded it that. Look at what Wal-Mart did to Kmart. That's a value chain story, not just supply chain. Some other companies are very good at managing the value chain as well. Southwest Airlines has it figured all the way out from the customer right back through the whole chain. Dell Computer is managing the chain from the customer all the way back through the supply networks. Another is Harley-Davidson. And Saturn, as Hau showed us.


I'm going to predict that within five years, we will have the battle of the value chains. And then it will shift to value networks after that.

Bur: Robert, I know it's always dangerous to disagree with you, but I'll put myself in jeopardy and point out that our recently approved master of science in supply chain management has a capstone course called Value Chain Management.

Gopal: I look at value chains and supply chains almost synonymously, and I'm trying to

figure out the difference. The word "value" is one that I fundamentally distrust, having been burned by it in so many different environments. And I'm trying to figure out what you mean when you talk about value chain versus supply chain. Are they really different? I don't buy "new-name proliferation."

Copacino: You get into semantics on this. I was asked by the Council of Logistics Management to develop a definition of supply chain and logistics. We had six prominent people on the committee I formed, and we could not agree on a single definition.

But I take the same perspective that Chris does. I think that supply chain done right is a value chain. It's an integrated supply and demand chain or an integrated value chain. When you think about it that way, you use it to drive revenues and innovation and create value—not just to reduce cost. And that's where you start to get strategic advantage. 

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