Ready for the DIGITAL FUTURE?

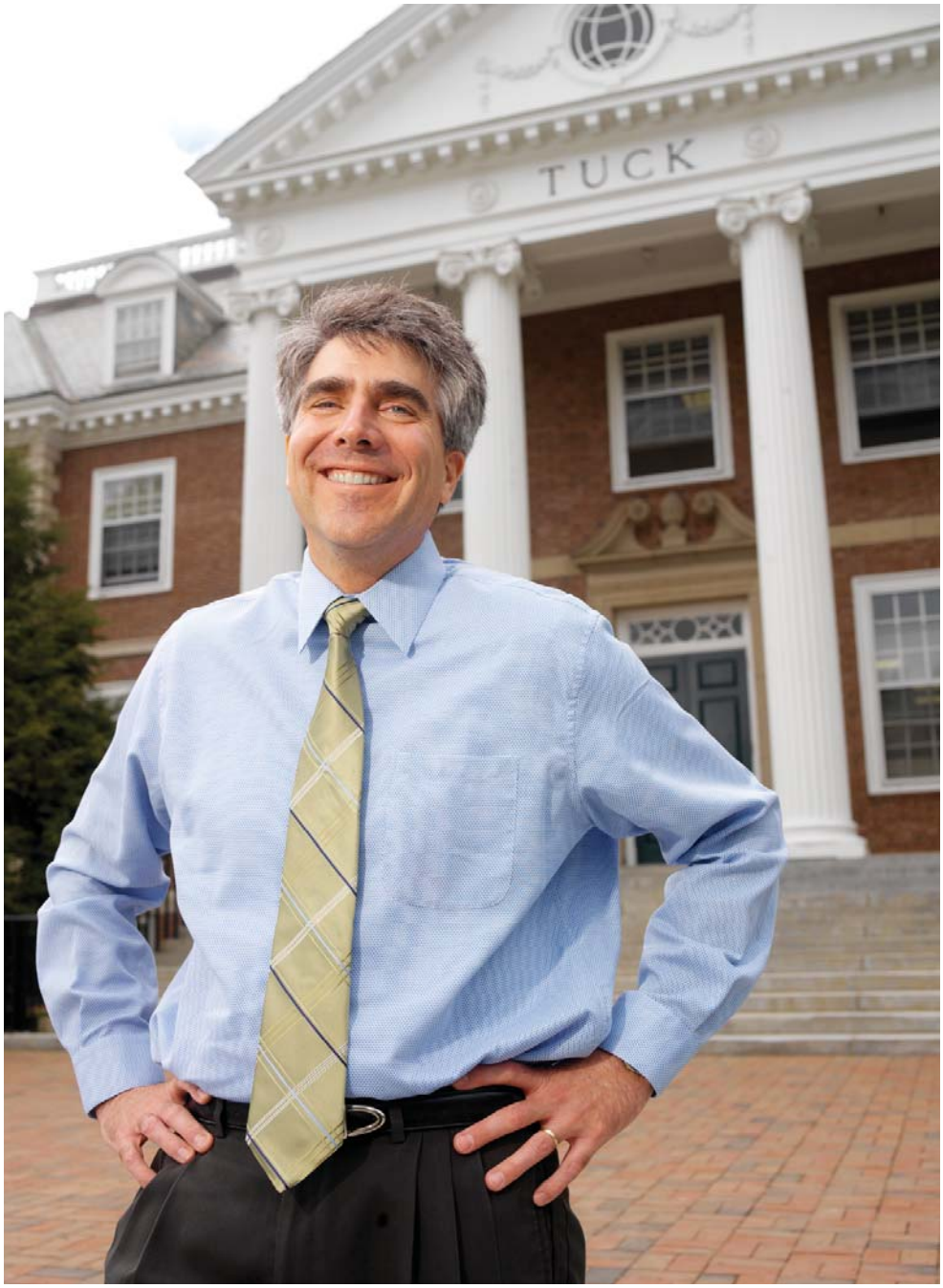
An Interview with M. Eric Johnson

It's become an established cliché to say that we're entering a digital future, a future in which the players who excel at using information technology to advance their business enjoy a decided competitive advantage. But, as with all good clichés, there's a solid underpinning of truth here.

M. Eric Johnson heads a research center that is helping to define and advance that digital future. As director of the Center for Digital Strategies at the Tuck School of Business at Dartmouth College, Johnson leads an innovative program that integrates industry and academic thinking around information technology and related business issues.

Several times a year, the center conducts thought-leadership roundtables with CIOs and supply chain executives from *Fortune* 500 companies. Those seminar discussions drive the research conducted by the center—research that in many cases has a strong supply chain component. The executive roundtables and resulting research also are integrated into the MBA program at Tuck, where Johnson serves as a professor of operations management.

Johnson's research and his involvement with the nation's leading IT executives give him a valuable insight into what companies must do to get ready for the digital future—or more accurately the digital present. He recently shared his thoughts with *Supply Chain Management Review* Editor Francis J. Quinn in an interview conducted at the Dartmouth campus in Hanover, N.H. (For more information on the Center for Digital Strategies, visit www.tuck.dartmouth.edu/digital/.)



Dave Bradley Photography

Q: *Much of the research conducted at the center is directly relevant to supply chain professionals. The work on supply chain risk is a case in point. Could you tell us more about it?*

A: To put the answer in context, I need to go back a bit. A lot of my earlier research around risk started with projects with high-tech companies and the toy industry. In particular, we were looking at the risks of operating in low-cost countries. We found that some of the risks were physical, like the longshoremen's strike of a few years ago, which created quite a bit of havoc. It came right in the middle of what would be the busiest season for toys, early fall, when everything was shipping through U.S. ports into Wal-Mart and Target and Toys R Us. Now, we've been dealing with these types of disruptions for a while. But we recognized that there are also many other risks—risks of currency fluctuation, risks of political disruptions, and so on.

That led us to think much more expansively about the nature of risks and, after 9/11, some of the wider risks we face as a country. We started spending more time looking at information risks in the supply chain and how supply chains could be physically disrupted through cyber attacks. We also looked at the risks to a firm's intellectual property when information is shared in an extended enterprise with supply chain partners. So our research had a short-term perspective—what happens if we are attacked in a way that disrupts our information flow in the supply chain. And it had a longer term component around sharing information with supply chain partners and how can you protect the security of your information, which has been largely outsourced in many supply chains.

Q: *Did any conclusions emerge on how an organization can minimize or mitigate these kinds of risk?*

A: A lot of interesting learnings emerged from this research. One that really caught my attention was that supply chain managers, and many managers in general, don't fully realize how dependent they are on information flows and on others in the supply chain. Thinking back a few years ago when the academics and the gurus talked a lot about supply chain integration, the feeling was that innovation in this area happened very slowly. But, in fact, supply chains are fast becoming integrated in many, often very subtle ways. That's reflected in our research, which time after time, has pointed to the growing dependencies in supply chains—both physical and informational. In fact, most companies would not be able to articulate the dependencies until they really start digging down deep into the details of their supply chain operations.

Q: *Is the awareness of the physical dependencies greater than awareness of the information dependencies?*

A: It is. Most people have thought about what happens if the truck drivers go on strike or if a port facility is closed. But they've given less thought to information dependencies and resulting risk, which can be much more insidious. At a simple level, we fall back on workarounds. If there's a problem with the Internet, the feeling is we'll just send faxes or make phone calls. But in many cases you're calling or faxing on the same IT line infrastructure that's carrying your Internet linkages. The backups in many cases aren't there.

But interestingly, the research also showed that while the information dependencies are increasing, many supply chains could continue to operate just fine if the Internet went down, even for a couple of days. The financial flows would be in big trouble, but there's enough "muscle memory" in the supply chain so that many manufacturers could keep delivering and customers would keep receiving their products.

The last interesting learning is more strategic, but it's really something that all supply chain managers should be considering: How do you protect intellectual property in your supply chain and with your partners. The research documented that all extended enterprises are leaking information all of the time. And they are leaking in ways that many managers would not believe unless I showed it to them. The leakage is immense in most organizations. How do you control that? How do you properly protect information about your products, information about your production plans, your ramp-ups of new products, new product introductions? A lot of that information is shared. And even though it may not be product specifications we're talking about, the supply chain information you're sharing is very strategic. Protecting those pieces of intellectual property in the supply chain is going to become increasingly important in the next five or ten years.

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That said, the state of the art around protecting information is, in many ways, still very undeveloped. If you bring the chief information officer or chief security officer into the room, they'll talk a lot about ways to harden up the network and tighten up the information access. But unfortunately, that often doesn't slow the leaks down very much. To be honest, understanding how to share data, particularly customer data, is very much an open issue. It's obviously an area that is ripe for some breakthrough.

Q: *Have you observed any successful techniques for minimizing the risks you've identified in your research?*

A: One of the best ways is to choose good partners with whom you're strategically aligned. Let's say you're outsourcing the manufacture of some product to China. You've probably read lots of articles about counterfeiting and production that gets dumped off into gray markets, and so forth. This can be very hard to control, even if you have put security measures in place. One of the best preventive measures is to have a production partner in China that really has a strategic stake in the business. So controlling or preventing your products or information from leaking out would be in their own best interest.

Q: *There often seems to be an inherent tension between information sharing and maintaining supply chain security. How do managers address this?*

A: Security often does produce friction in the organization. No one likes to get the e-mails from the chief information officer telling them they have to change their passwords, or they have to log in a different way, or they need to carry around some hardware key to put on the back of their PC. Every one of these kinds of things can be viewed as friction. At a business level, this friction manifests itself many times in our willingness—or really our unwillingness—to share information. So if I'm a large retailer, am I willing to share customer information with my manufacturing partners? If I'm afraid that you aren't going to protect that information, I won't be too willing to share that. Of course, that's going to inhibit our ability to collaborate.

Many executives have spoken to me about wanting to work with innovative startup companies or new supply chain partners. But they end up being frustrated because of the security concerns over working with those partners. These are all inhibitors to collaboration. In fact, the Center's whole interest around security was driven by an attempt to understand how security and concerns for security erode collaboration. There certainly is a trade-off in many people's minds. We've yet to really figure out how to create security systems that truly enable collaboration, not detract from collaboration.

Q: *Turning to another growing area of interest for readers, tell us about your research on sales and operations planning (S&OP).*

A: The research really started with an executive roundtable we did around S&OP. We heard many of the things that we thought we would hear—the challenges of getting marketing and sales, and operations, and supply chain,

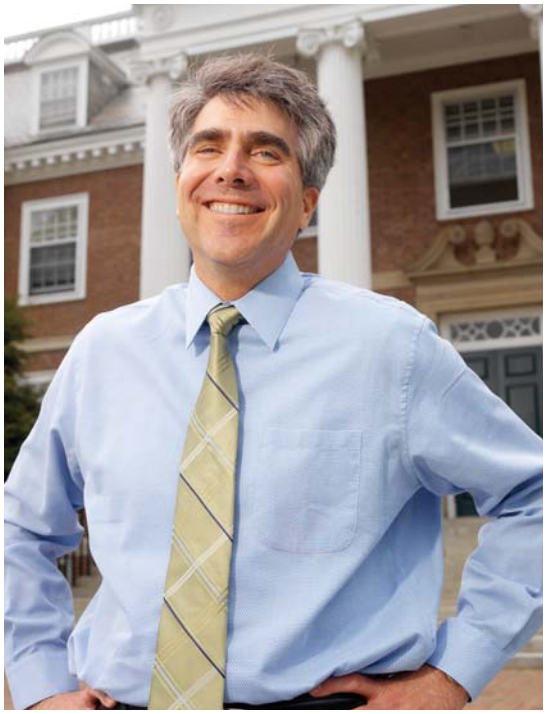
and the planning functions to all work together. Many times, the inability to collaborate among these functions boils down to issues of trust. In fact, that's one of the reasons we've been so focused on another area of research that I'll talk more about later: how to build trust in the supply chain.

Q: *What are some of the other barriers to effective S&OP?*

A: Well, that issue of trust really seems to erode sales and operations planning more than anything else. But another barrier involves incentive systems that are incompatible with promoting internal collaboration. That is, sales organizations having incentives that are not really compatible with supply chain incentives. And in some cases, the two have business objectives that are different. But at the end of the day, some of the worst problems keep coming back to a lack of trust that develops between different organizations over time. So if I'm a supply chain manager and I'm getting sales forecasts that I really don't believe anymore, I take matters into my own hands and make my own forecasts. Before long, it becomes a series of "lies and damn lies." The issues that thread through all of this are how can trust be built between organizations and how can information technology improve trust.

One thing we've found is that creating better visibility in terms of information sharing does improve trust. Through repeated episodes of sharing information, where people see that the information is true and viable, trust builds within the organization and, in particular, around sales and operations planning. That leads to sharing information around promotions and around promotion planning. It leads to a better understanding of what the sales and marketing organizations are trying to accomplish on the one hand, and the transportation and distribution constraints of the supply chain on the other. The more information shared across those two groups, the greater the trust.

This is interesting. We find that in many organizations some of the best sales and operations planning happens at a very human level. It's basically groups of people together in the same room on a regular basis. Now, this doesn't sound too high tech, or 21st century, but it's certainly effective.



The notion of a product and service being distinct has really vanished in almost every part of our economy.

Q: *Does the trust issue also extend to your external supply chain partners—your suppliers, carriers, third-party logistics providers?*

A: Absolutely. In fact, we recently studied a firm that had some real liability problems in this area. They would quote delivery dates to customers and then miss those dates. Of course, that has a devastating impact on trust and on the willingness of the partners to collaborate. A very simple but true lesson is that you can't expect to foster a trusting environment if you're not able to deliver on your promises. So fixing those relatively simple things like delivering on time is the first element to building trust and collaboration.

I recently spoke with one executive who made an excellent point about collaboration. He noted that one company he was working with was always talking about how they wanted to collaborate. Problem was, any time something started going wrong—say, the delivery wasn't so reliable—suddenly they kind of disappeared and weren't so willing to work through those issues. The lesson here is that if you want to collaborate, you have to collaborate in the good times and the bad times. You can't just show up when things are going well and happily say, "Let's collaborate and share information and trust each other." You have to be there during the tough times, too.

Q: *Is technology an enabler of trust?*

A: It certainly is an enabler, but it can cut both ways. Let me give you a good supply chain example of that. Think about something like the tracking system that FedEx introduced to the world. That visibility is a trust builder for many of its customers. But at the same time, providing that kind of visibility also can erode trust if you don't have excellent execution. So opening up and creating visibility builds trust even in bad times if you're able to deliver. But creating visibility into processes that aren't working so well can be quite painful and actually erode trust.

Q: *Another high-priority research effort centers on the service supply chain. What's the focus of your work in this area?*

A: This is a very interesting and relevant subject for supply chain people. The notion of a product and a service being distinct has really vanished in almost every part of our economy as more and more products and services are bundled together. In fact, many times the product now is almost like the Trojan horse to get you in the door. For example, you used to think your job was to sell cars. But really your job now is to sell services that can be plugged into those cars, and the car is there to be the carrier of the service.

We might laugh about that at first, but it's getting harder and harder to find examples where that isn't happening. It's certainly happening with personal computers. When Dell sells you a box, much of their profit will generally come through all the different software services that they'll be selling you when you set it up as well as through the maintenance and repair of the box. This is clearly seen in celebrated products like the iPod. In fact, iPod, is probably one of the most interesting integrated product/services we've seen in a while. You have a completely new digitally enabled business model in the music industry. There's a piece of it that has a manufactured product that supply chain managers think about shipping and inventorying and moving through a supply chain. But it's also got a very strong service component, which is, in many cases, digitally enabled. It's in the marrying of those two together where the real genius of the business strategy and value creation lies.

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Q: *Any other research areas you would like to mention?*

A: The last one is really related to everything we've discussed up to this point. We call it digital integration, but really it's the integration of information technology between firms. In researching supply chains both in the United States and in Europe, we sought to understand when the integration has been most successful. One of the many interesting things we learned is what I call the selfish principle. That principle says that if you carefully look at many of the best integration projects, you will find selfishness is the main driver. In fact, selfishness is what actually made them successful. I'll give you an example.

When you think about initiatives like collaborative planning, forecasting, and replenishment, it's often easy to start down the garden path of saying, "Well, collaboration is good, and therefore we need to collaborate and integrate and share information." But if those initiatives are started without clearly thinking about how they are really going to benefit the organization, they will fail. These projects typically start with a lot of meetings, a lot of fanfare. You get a couple of business partners in the room and you talk about integration. Everybody thinks that it's great. But after the initial euphoria subsides, if one side or the other can't clearly see the benefit to their organization—and this is where the selfishness comes in—then the initiative eventually dies.

On the other hand, some of the most successful integration projects I've seen were started by one partner seemingly for very selfish reasons. In other words, one partner stood to benefit tremendously if they could figure out how to better share information. Following my selfishness principle, if one partner really does stand to benefit greatly through the integration, then that means there is some serious business value to unlock. In terms of sharing the benefit, then, it doesn't have to be 50/50 and it might even be 60/40. But the point is even if I only share 20 percent with you, it's 20 percent of a big number that you would not have achieved otherwise. So we're both a lot better off.

Q: *Let's now talk about what makes for a good digital strategy? Are there certain common characteristics?*

A: Let me begin by explaining how we think about digital strategies. We see information technology as an enabler of good business strategy. In other words, we don't really believe that strategies are in some sense uniquely or only digital. There are good business strategies that are digitally enabled, and they are good because they're good strategies to begin with. Information technology allows you to bring those strategies into action. So when we talk about digital strategies, we're really talking about how information technology enables a strategy (and the underlying business processes) of the organization.

We find that companies with the best digital strategies are ones that fully leverage the enabling features of IT in their strategy development. These firms see the CIO as a business innovator—not simply a utility operator. So, good digital strategies are ones that:

- Are aligned with the business strategy.
- Harness the organization's unique competencies.
- Enable new levels of agility, trust, and collaboration—all of which are needed in today's ever more decentralized and increasingly partnered global network.

Let me give you an example. If a firm sees its key strategic advantage as being around its marketing and customer innovation, then its digital strategies should support that. Too often you find executives spending a lot of time working on projects that are not really aligned with the firm—for example, concentrating on outsourcing customer support to reduce cost when the firm is really focused on building revenue growth through customer intimacy. There is nothing wrong with cutting costs.

But, projects that are not aligned with the goals of the organization are often doomed to failure. So when we think about good digital strategies, we are not thinking about specific technologies, but rather applications of technology that truly support and leverage the business strategy.

Q: *Is there a different mindset at the top companies with good digital strategies?*

A: The best way to answer that is to look at real-world examples. One of my favorites involves a venture that Dow Corning launched a couple of years ago. One day this old-line manufacturer of silicone products found that they were competing in what had essentially become a commodity business. Dow Corning was a high-service, high-cost provider. So they really needed to figure out how they could prevent their core customer base, their really large users, from hitting the streets and going after cheaper, more readily available sources of their commodity.

They came up with a digital strategy that was closely linked to a marketing strategy and a supply chain strategy. Basically, it said let's rethink this core set of big customers. They typically don't need a lot of the services we provide, and they don't really want to pay for those services. What they really do want is to purchase large quantities at very low prices. So Dow Corning introduced a new model they called Xiameter. Basically, this is a Web-enabled business model for silicone-based products that features low prices and simplified transactions. It was implemented as a business startup within the organization but was delivering exactly the same product as before. The difference was that it was rebranded as Xiameter, and it had some very specific business rules related to the supply chain. For example, the product had to be purchased in very large quantities with fixed, set, delivery schedules. In addition, it had to be ordered directly on the Web without any of the services.

The new model enabled Dow Corning to lower their order transaction costs but that really wasn't the real value. The real value was in their supply chain strategy. Dow Corning was able to move from a made-for-stock to a made-to-order manufacturing approach for these large orders. And in doing so, they dramatically unleashed value—in this case, reduced cost in their manufacturing and supply chain processes—and passed that value on to the customers. So it was a marketing strategy: rebranding the product. It was a supply chain strategy: moving from a made-for-stock to made-for-order with strict business rules and low prices. And it was an IT strategy: pulling together everything in a digital offering on the Web.

Q: *And the three strategies came together?*

A: The three came together. The digital strategy was really the enabler of the new marketing and supply chain strategy. And we would argue that all good digital strategies enable new functional strategies. There's a lot of debate among CIOs about whether IT can create competitive advantage. We would argue that by itself it doesn't; it only does so when interlocked with a business strategy.

Q: *How does an organization foster the kind of creativity that Dow Corning showed?*

A: There's always going to be a need for good people who can come in and help build more effective supply chains. Supply chain managers are getting better at what they're already doing, and information technology will help them get even better. But the real value that supply chain managers, as with many other managers, can add to an organization is applying innovation inside of their organization and then leading change around that.

In fact, we recently hosted a workshop for chief information officers focused on just that issue, how do you lead change—how do you make change happen. We're following that up with an event that will focus on innovation within a large organization. I would argue that this same type of exercise is critical for supply chain managers as well. Obviously, it's still important for supply chain managers to work to reduce transportation costs or improve inventory levels or to make the distribution center operate more effectively. That's all good, but it's not going to be good enough going forward. The executives and managers who really get it are going to be leading much bigger innovation efforts.

Well, how do you do that? First and foremost, you have to learn your business very well. It's just as true for supply chain executives as it is for IT executives. Many supply chain people allow themselves to get too focused on the logistics of their organization—the running of the trucking, warehousing, distribution center operations, and so on. All of this is important. But what's far more important for supply chain managers is to really understand the business that they're in—whether they're making toothpaste at Colgate-Palmolive or computers at Hewlett-Packard or routers at Cisco or dishwashers at Whirlpool. They need to fully understand the business markets and then look for opportunities they can bring to those markets.

Q: *Won't that entail a major change in mindset for many supply chain managers?*

A: Yes, but it's necessary. Just think about what's happening with outsourcing and job migration in many parts of our economy. CIOs have been facing this quite dramatically for several years now. Whole pieces of their organizations have been lopped off. One day they have a few thousand people reporting to them; the next day, there's hardly anyone because all of the jobs have been outsourced.

I would argue that the exact same thing is happening, and will continue to happen, to supply chain executives. There's

no reason why many of the things currently done in the supply chain organization need to be done in the United States. For instance, you could be sitting in India and managing a transportation lane in the U.S. just as easily as you could be managing a U.S. server from India. So people in our business, the business of supply chain management, really have to focus on thinking about how to innovate in the supply chain because that's where the jobs in this country are going to come from. But the job of managing the freight lane between Memphis and Detroit could be in Bangalore tomorrow.

Q: *That's a comforting thought to our readers, I'm sure.*

A: It actually could be pretty exciting development for supply chain managers in many ways. The supply chain is becoming ever more important strategically in organizations. We saw the shift ten years ago from an essentially logistics/transportation focus to a broader supply chain focus. This is just another step in the process of the supply chain becoming a much more integrative and strategic kind of function.

Q: *With regard to the CIOs you just mentioned, do you think that they and their supply chain counterparts are doing a better job of communicating than they did in the past?*

A: The disconnect certainly still exists in many firms, but I think that we're seeing a big change in the way many firms initiate and then fund large IT projects. The days of CIO-driven initiatives are disappearing. It's much more common today to find CIOs who are part of a team around an initiative, and they're really there as an enabling partner. Today, the technology initiative itself is typically driven by the supply chain executive rather than the IT executive, which tends to focus the business case more sharply.

Q: *Obviously, this more collaborative approach brings business benefits.*

A: That's particularly true when you talk about supply chains because supply chains by their very nature are collaborative initiatives of many different partners, both external and internal. The idea of "we will build it, and they will come" has never been very successful in the supply chain world. You've got the challenges of bringing not only your own supply chain constituents to the table but also your partner's supply chain constituents—whether it's your downstream resellers or your upstream suppliers. That takes tremendous negotiation and collaboration skills. And if you don't have those, your solutions don't get adopted. Or if they do, they don't last. We've all seen plenty of cases where something is implemented, and we read about how wonderful it is, only to come back a year or two later to find out it's been completely scrapped.

Q: *What are the implications of what we've talked about today for educational institutions?*

A: I think the established programs like Tennessee and Michigan State and Penn State get it. They have incorporated pieces of marketing, pieces of information technology, pieces of logistics, pieces of operations, into one very cross-functional group called supply chain. They really do see that as the future. We would say much the same thing in our world here at Amos Tuck where our focus is around developing general managers. Good general managers need to personally understand supply chains. They can't just pass everything to their vice president of supply chain.

As for the MBA students here at Tuck, many of them are after jobs in large private equity firms. Or they're interested in jobs in banking and consulting. In every one of these areas, supply chains have become a very important component. If you have private equity funds buying up companies like Burger King, they have to know how to run a supply chain. The days of bankers not having to worry about supply chains are long gone.