The
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Section 1:

Insights on Supply Chain Leadership

The End of a Fairy Tale

In the development of supply chain management processes, we've spun a fairy tale. It's a story about people believing that functional excellence delivers supply chain superiority. As a result, year after year, well-intentioned people have toiled against programs and improving metrics that reduced, not improved, the effectiveness of the supply chain.

An example of misaligned metrics is an organization with a strong focus on return on assets (ROA), but Supply Chain Insight's research finds that a strong focus on ROA may actually degrade operating margin. For the supply chain traditionalist, this may seem counterintuitive, but for most companies, it's true: ROA is no longer a good proxy metric for total supply chain costs. There's a need to manage the supply chain cross-functionally to drive end-to-end cost management. During 1991, in distribution-based companies, distribution costs outstripped manufacturing costs. A blind focus on functional excellence will cause the supply chain to fall out of balance.

So, what's the "big, bad wolf" in this fairy tale — the monster that's swallowing up the supply chain? It's continued investment in multiyear enterprise resource planning (ERP) projects. The big, bad wolf is usually most prevalent in a functional organization, and ERP systems are usually very focused on driving functional metrics.

Please don't get me wrong. I believe that companies need an ERP implementation, but they need to do it once and do it well. The big, bad wolf raises its head and sniffs the air when the ERP project grows arms and legs and becomes a multiyear project to solve everything. The big, bad wolf rears its ugly head once again when the system is focused on local optimums and functional metrics.

There's an opportunity cost for organizations in multiyear ERP rollouts. When I see a company working on its third, or fourth, ERP upgrade, looking blindly — and only — at supply chain planning and analytics from its ERP vendor, I see the big, bad wolf at play. Here's the pressing issue: the supply chain problem has changed, but we're implementing the same old technologies without stopping to realign against new goals.

Let's look at this more closely. Based on recent research, over 90% of companies today have an ERP system and an advanced planning system (APS). These technologies are mature and in the

evolution phase — that is, being refined by user-based enhancements. The consolidation of this industry has served the technology providers well, but has largely stymied innovation. Yet many manufacturing and distribution companies are still investing millions of dollars in ERP upgrades, expecting to improve operational excellence. But many of these technologies are now legacy. It's time to slow down the system upgrades, taking action only when they're mandatory.

The opportunity cost for multiyear ERP project deployments to an organization is huge. Based on the analysis of financial ratios, companies with the best results on revenue per employee have strong ERP systems, but they've implemented only once and avoided multiyear evolution projects. ERP is valuable to improve transactional accuracy, but continued investments haven't reduced inventory or improved cash-to-cash cycles. The ERP and advanced planning systems that were developed in the 1990s are now largely legacy applications. As a result, companies should stabilize their investments in these technology areas, and begin to push the acquisition of technologies that can better align with the organization's need to reduce operating margins, absorb volatility, and drive agility.

For most companies, the use of supply chains to redefine business models isn't a current reality. Instead, they see supply chain as a function within the greater organization, and don't see the end-to-end supply chain process as a way of doing business. They don't have the power to redefine business systems to be an Apple, Amazon, Dell, or Zara. So, to use these examples "as points of light" to help companies go forward is a bit like saying Lora Cecere will be the February cover model on Vogue magazine You got it! There's a low probability that this will ever happen.

To understand this point, let's take a closer look at the food manufacturing sector.

A Case Study

As a researcher, it's getting harder to compare companies due to merger and acquisition activity. The peer groups are growing more complex. I don't believe that you can put companies from all industries on a spreadsheet, shake them up, and gain insights about supply chain excellence as a result. Instead, I think that the best insights come from comparing peer groups.

In Figure 1, we compare ten-year averages (2001-2011) for food manufacturing companies. In this industry, operating margin has decreased by 1%, ROA has decreased by 2%, SG&A margin

has increased by 1%, and days of inventory have increased by 3%. As shown in the table, the food manufacturing industry is a tough market, and supply chain excellence matters. The only good news for the industry is that revenue per employee has improved by 29%.

Figure 1. Ten-Year Averages — Food Manufacturing Companies

Industry	Company	Operating Margin	SG&A Margin	Return on Assets	Revenue per Employee (K$)
Food	Campbell Soup Co.	0.17	0.77	12%	338
	General Mills, Inc.	0.18	0.78	8%	430
	Groupe Danone S.A.	0.13	0.64	6%	201
	Kellogg Co.	0.16	0.73	9%	392
	Kraft Foods, Inc.	0.14	0.79	5%	363
	Nestlé S.A.	0.13	0.59	10%	299
	Average	**0.15**	**0.71**	**8%**	**336**

Source: Supply Chain Insights LLC, Corporate Annual Reports 2000-2011
Operating Margin: (operating income)/ (revenue)
Return on Assets: (net income)/ (total assets)
Revenue per Employee: ((revenue)/ (employee count)
SG&A Margin: ((revenue – sga)/ (revenue))

The answer for this industry is not to copy the supply chain from Amazon or Apple. Instead, the goal is to be more like General Mills. Note in Figure 2 how the company has improved operating margin for the past three years, whereas Kellogg has gone backward. Over this period, the cereal business has been hit hard by commodity price increases and private labels. Corn and fuel oil have tripled in cost, and both commodities are more volatile.

Figure 2. Metrics Comparison of the Kellogg Company vs. General Mills, Inc.

Source: Supply Chain Insights LLC, Corporate Annual Reports 2006-2011
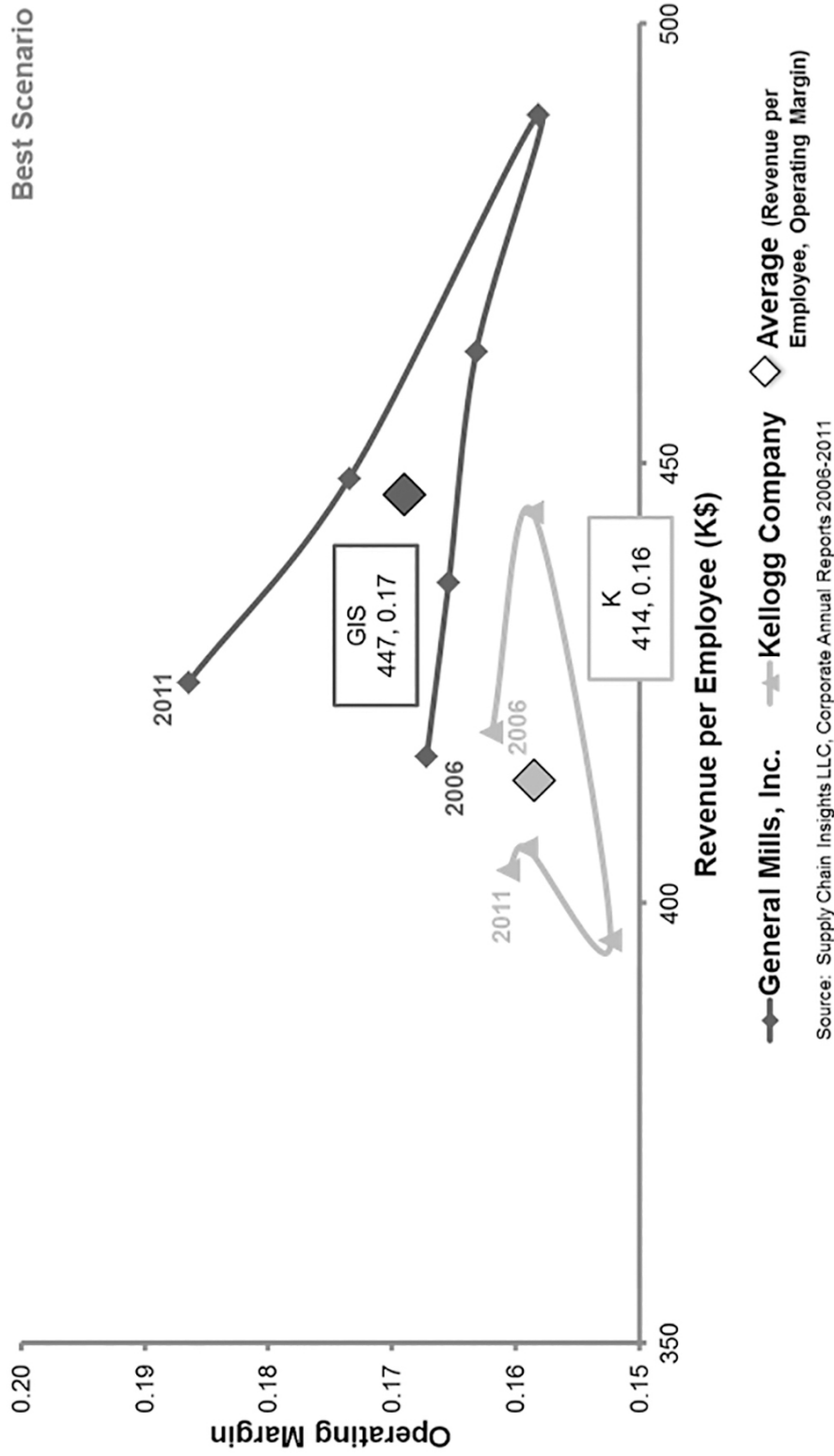
But why has General Mills been able to increase operating margin and not Kellogg? General Mills has side-stepped the big, bad wolf. The company implemented ERP once and well, and Kellogg has had multiple ERP implementations. General Mills is more aligned on cross-functional metrics, and has made more progress on the implementation of horizontal processes.

Supply chain planning maturity also matters. One of the core reasons for the difference is that General Mills is good at supply chain planning. The company is at the top of its peer group in forecasting, and it uses its forecasting analytics to drive better plans. General Mills has become best in class at network design, and it is very active in the use of advanced technologies for inventory optimization. Unlike many companies that buy technologies for a project and then don't use them, General Mills has built the teams to actively model demand and supply, and to drive better results. It had the courage to give up ROA to drive better operating margin.

Where to Invest

So, if you're a supply chain leader, what do you do, and where do you invest? The answer lies in the use of new forms of analytics for network design, demand and supply sensing, supply chain visualization, demand orchestration (horizontal orchestration of demand and supply variability for price, material substitution, and alternate sourcing), and the use of listening posts to better understand unstructured data from the channel. The adoptions of these new technologies can't be a fad — they must be part of the DNA of the organization.

For example, multitier inventory optimization was a fad in the last decade. It was overhyped, and the projects largely under-delivered. Unfortunately, many companies have invested in inventory optimization, but haven't reduced inventories. The answer is a lot like why people don't lose weight while on diets: it takes commitment, hard work, and discipline to do so. Unfortunately, these three characteristics elude many organizations.

I want to leave you with a couple of thoughts. There are many technology vendors that will knock at your door today, asking for your time. My advice is to stay focused on what matters during these conversations. Remember: our goal in supply chain is to reduce costs, improve customer service, reduce inventories, and drive growth. Over the course of the last decade, most companies have gone backward, not forward. We need to hold ourselves accountable to improve financial results.

It will take new forms of analytics and cross-functional thinking to push us off of this supply chain plateau. Evolving and taking advantage of new opportunities must be part of your organization's DNA.

The Parallels Between Triathlon Training and Financial Ratios

I have never been an athlete. At the age of 58, I buried my mother in November 2012, who died from complications from Alzheimer's disease. It was a long, hard, eight-year struggle and tough on my family. One of the sad outcomes of the disease is that you don't know how to grieve. The victim of Alzheimer's slowly slips away, and the person that you bury has very few resemblances to the person that you loved. So, as I buried her, I became obsessed with learning how I could reduce my chances of getting the disease. As a daughter of a mother with Alzheimer's, I'm high risk (35%). This landed me in an intense discussion with my trainer and doctor about blood flow into the brain through endurance training, and how that might reduce this risk.

My long-term blog readers may remember that, two years ago, when I left AMR Research after the acquisition by Gartner Group, I became more serious about my health. I started training six hours a week and lost 37 pounds. Those of you who know me personally also know my frustration with trying to drop another twenty pounds, which has been my goal for the past two years. Although I've lost 22 inches through diet and exercise, and improved my body mass index by 11%, I haven't dropped weight.

After the death of my mom and the discussions with my physician about fighting the probability of getting Alzheimer's, I started training with a new vengeance over the holiday season. My goal is to live better for the rest of my life. Yes, it is hard. My trainer is unmerciful. He has set new targets for monitoring my heart rate, and I've kept up with training as a result. In fact, I recently ran and completed my first triathlon.

Truth be told, it was only a sprint triathlon (10-minute swim, 30-minute bike, and 20-minute run), but I finished it having never thought that I would compete in a triathlon — a year ago, I couldn't run to the mailbox! And not only did I finish the event, but I was in the middle of the overall rankings as an overweight 58-year-old woman. I finished despite cramps in my calves and a tough travel schedule getting to the event.

But why tell you this story?

I see a lot of parallels in the training that I did for the triathlon and the work that I'm doing on financial ratios. As I write the book *Metrics That Matter*, I've been analyzing twenty years of supply chain financial ratios and looking at the trends. It has been fascinating for me to study the financial results of clients that I've worked with for two decades and to see how their supply chain strategy documents translated (or did not translate) into financial results. I spoke more about this during my European book tour for *Bricks Matter*.

Here are the parallels.

Balance

When I first started training, my muscles got as stiff as a board. Through aging, I lost flexibility and balance. I now spend an equal amount of time stretching to improve balance as I do on weights in strength training. I'm amazed how strength training reduces balance. Similarly, in the evolution of supply chain practices in the past decade, we haven't had a sufficient focus on balance and flexibility. The evolution of tightly integrated ERP solutions to business intelligence (BI) and advanced planning systems (APS) has created tight and inflexible links. As part of the training plan, companies must focus on balance and flexibility for supply chain excellence. Only 10% today are happy with their what-if analyses and ability to understand change. We need balance between front-office and back-office activities, and we need to understand the implications through what-if analysis to drive flexibility. Supply chain excellence is about much more than short cycles. It needs to be deliberate. We have taken tight integration of supply chain applications to ERP too far, and have lost our balance and flexibility.

A Clear Plan

I'm a strong swimmer and a weak runner While I can swim for seventy-five minutes and enjoy the time in the pool, I have to force myself to run. To complete this event, I had to focus on what I didn't like to do, and learn how to balance my energy and body motions to finish the run. Likewise, in today's supply chain environment, leaders favor a single function of logistics, manufacturing, or sourcing. They haven't forced themselves to learn all three. To complete the race for supply chain excellence, companies must be good at all three, with strategies on how to reach a balance between the functions in day-to-day operations. This requires a plan. Too few companies have a clear supply chain strategy. While the answers to the quantitative surveys we conduct at

Supply Chain Insights state that over 60% of companies are comfortable with their supply chain strategy, only 5% of companies truly have an adequate plan that drives a clear road map to help the organization transition from business strategy to supply chain strategy. And, for clarity's sake, this is not a strategy for the supply chain department. Instead, it's the design and implementation of a value chain strategy that gives a plan to create differentiation from the customer's customer to the supplier's supplier.

Measurement

Over the last decade, the only metric that we've improved in the supply chain is revenue per employee — a measurement of productivity. Only the high-tech industry has been able to effectively make improvements on the Effective Frontier of supply chain management — balancing growth, productivity, cycles, and complexity — and drive resilience out of the Great Recession of 2007-2009. Companies that aren't looking holistically at metrics are stuck. What do I mean by this? The process industries have mistakenly viewed return on assets (ROA) as the proxy metric for reducing operating costs. In many ways, it's like my focus on weight in my training for the triathlon versus my BMI or inches. The measurement of the BMI is harder. It's easy to hop on a scale and know your body's weight, but it's harder to understand lean body mass. Similarly, only 23% of manufacturers can easily measure profitability. In my research on profitability models for manufacturers, I can't find a good packaged solution for companies to easily model profitability in building market-driven value networks. As a result, companies will be forced to build it themselves using technologies for what-if analysis on strategic modeling from network design tools. It's worth it, though.

The Need for a Coach, Leadership, and Grit

In the study of financial metrics, I've found an inverse relationship between companies that have had a strong dependency on supply chain consultants and results. The companies that have done it the best have actually driven supply chain excellence through internal leadership. This doesn't mean that the organization doesn't need a coach, but there is no substitute for internal leadership, discipline, and true grit. In the words of a supply chain pioneer in *Bricks Matter*, "No true supply chain transformation can happen in less than three years," and "There is no substitute for leadership." The coach needs to be carefully selected based on training needs, but should participate only to guide the plan, not to do the hard work.

A Compelling Event

I wouldn't have done this without a compelling event: my mother's death and the probability of dying similarly. I'm trying to fight back. Likewise, in the history of supply chain management, over the course of the last twenty years, more success has happened through failure than success. Company transformation usually happens following a deleterious event.

Finally on Our Way to Judging Supply Chain Improvement

Long story short, finishing my first triathlon was exhilarating. I had no idea that I could do it! I'm now in training for a longer and tougher event (half-mile swim, fifteen-mile bike ride, and a 5K run). I've built a one-year plan, and I'm working hard with my coach, monitoring my heart rate, BMI, and time. I'm also focused on building strength, flexibility, and balance. Each of these elements requires hard work for this gal who has never been an athlete, but I'm trying hard to fight the momentum of time.

I think there are insights here for the supply chain leader. While I can measure my improvements as an athlete, the supply chain leader lacks a measuring stick. There is no good way to judge supply chain improvement. As a result, I have built the Supply Chain Index. I want supply chain leaders everywhere to be able to judge their improvement versus their peers.

What I've Learned About Supply Chain Excellence

I go back and forth. At times, I reflect on how fast things have changed, while, at other times, I struggle with why supply chain processes can't happen quickly enough and be transformed faster. Even though I've studied it for the past nine years, for me, it's still a conundrum.

The way I see it, it should be like a man on a moving sidewalk: the supply chain processes are slowly evolving and propelling us forward, but we are moving at a faster pace.

After a year of studying supply chain excellence for *Bricks Matter*, I don't think that we have best practices. Instead, I think that we have evolving practices Here are my insights.

What Is Supply Chain Excellence?

After studying supply chain excellence for a year, I don't think that companies can start with "process." I think that the application of generic processes without a sound understanding of supply chain strategy has been a mistake for many.

The best companies propel themselves forward with a clear understanding of supply chain strategy; a well-defined, multiyear road map; and an unobstructed view of how to make trade-offs on the Supply Chain Effective Frontier, shown in Figure 3. They invest in talent and have a sound understanding that the best supply chain isn't the most efficient. Instead, they understand that the most effective supply chain balances the trade-offs of growth, revenue, and costs, while managing working capital, corporate social responsibility, and asset strategies. These trade-offs need to be based on the corporate strategy.

Figure 3. The Supply Chain Effective Frontier
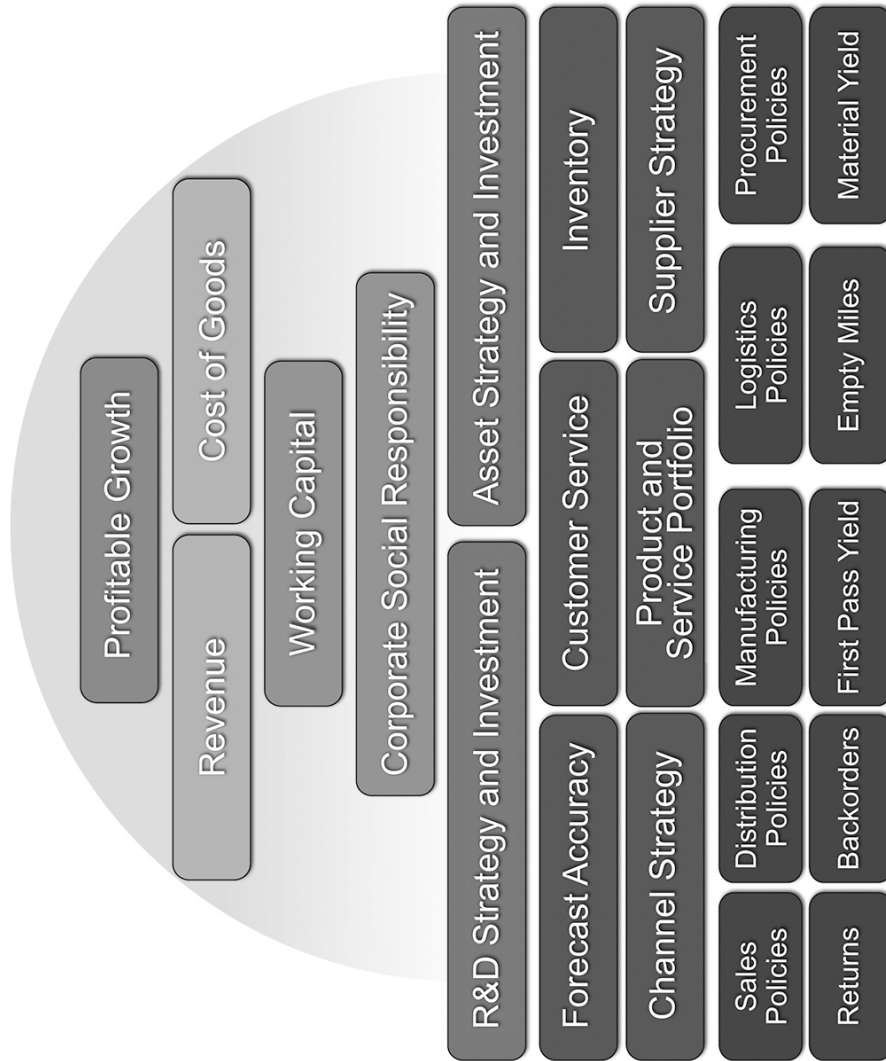
Companies that shine and are good at delivering value through their supply chains focus on the trade-offs at the top of Figure 3. This is in contrast with companies that are laggards that only look at the waste or the symptoms of poor performance at the bottom of this figure.

Leaders understand that there needs to be balance, and that the policies for channel strategy, product portfolio management, and supplier development strategies make a difference They also understand that supply chain excellence requires the mastery, or the knitting together, of complex processes into a complex system. It must be managed as a complex system.

My Frustration

In the past month, I've worked with multiple companies that believed they had a clear understanding of supply chain excellence, but were only looking at a limited view of manufacturing or procurement excellence. I'm frustrated because, over and over again, I see poor work on supply chain benchmarking. I believe that 90% of supply chain benchmarking projects are fundamentally flawed in three ways:

- **Self-reported data is inaccurate.** Any time that you have self-reported data on forecast accuracy, customer service (on-time delivery or perfect order), or manufacturing reliability, expect problems. Each of these measurements lacks a clear industry standard for reporting, and, as a result, they're based on very different definitions. In addition, based on real-world experience of supply chain benchmarking, there's usually a positive organizational bias to overstate results in each of these areas.
- **Peer group is essential.** Supply chains must be compared by peer group. You can't put all supply chains in a spreadsheet and shake them up.
- **Apples-to-apples comparisons are fundamental.** The data also must be from the same time period. It must be current.

Making Trade-Offs

As a result, I've started studying the financial trade-offs that companies have made in supply chain leadership by analyzing twenty-five years of financial balance sheets (see Figure 4). To understand supply chain excellence, Supply Chain Insights is plotting peer groups at the intersection of these metrics and attempting to tie this understanding to the maturity models that are built into

our research studies. We believe that the companies with the best supply chains have three characteristics:

Figure 4. A Study of Financial Ratios to Understand the Supply Chain Effective Frontier

Financial Metrics

Growth	Profitability	Cycle	Complexity
Common Shares	Cash	Cash-to-Cash Cycle	Altman Z
Employee Growth	Cash Change in Period	Days of Finished Goods	Capital Turnover
Employees	Cash on Hand	Days of Inventory	Current Ratio
Market Capitalization	Cash Ratio TTM	Days of Payables Outstanding	Quick Ratio
R&D Margin	Cash Ratio Quarter	Days of Raw Materials	Return on Assets
R&D Ratio	Cash Ratio Year	Days of Sales Outstanding	Return on Equity
R&D to COGS Ratio	Cost of Goods Sold	Days of Work in Progress	Return on Invested Capital
Revenue	EBITDA	DPO/DSO	Return on Net Assets
Revenue Growth	Free Cash Flow Ratio	Finished Goods Inventory	Revenue per Employee
Revenue Growth TTM	Gross Margin	Inventory	Working Capital Ratio
Revenue TTM	Gross Profit	Inventory Turns	
SG&A Margin	Net Profit Margin	Receivables Turns	
SG&A Ratio	Operating Cash Flow Ratio	Raw Materials Inventory	
SG&A to COGS Ratio	Operating Margin	Work in Progress Inventory	
	OPEX Ratio		
	Pretax Margin		

Source: Supply Chain Insights LLC

- **Positive system momentum in peer group performance** — Each supply chain has its own unique potential, but the best supply chain has a positive upward momentum while balancing the trade-offs.
- **Balance** — Supply chain leaders maintain balance of these metrics against a supply chain strategy, showing positive momentum in peer group comparisons in each area.
- **Steady, unfaltering, year-over-year progress** — The supply chain journey happens over many years. The best supply chains are reliable, and can drive year-over-year progress.

A Case Study

Consider the results of two competitors, PepsiCo and The Coca-Cola Company (see Figure 5). When comparing year-over-year revenue per employee to cash-to-cash cycles, PepsiCo shows a positive trend (revenue per employee shows steady progress without swings in cash-to-cash cycles), while Coca-Cola's results are erratic.

Just remember, we're all on moving sidewalks. Keep in mind that it's a journey, not a sprint, and be clear on the final destination.

Figure 5. Comparing Cash-to-Cash and Revenue per Employee

Source: Supply Chain Insights LLC, Corporate Annual Reports 2002-2012
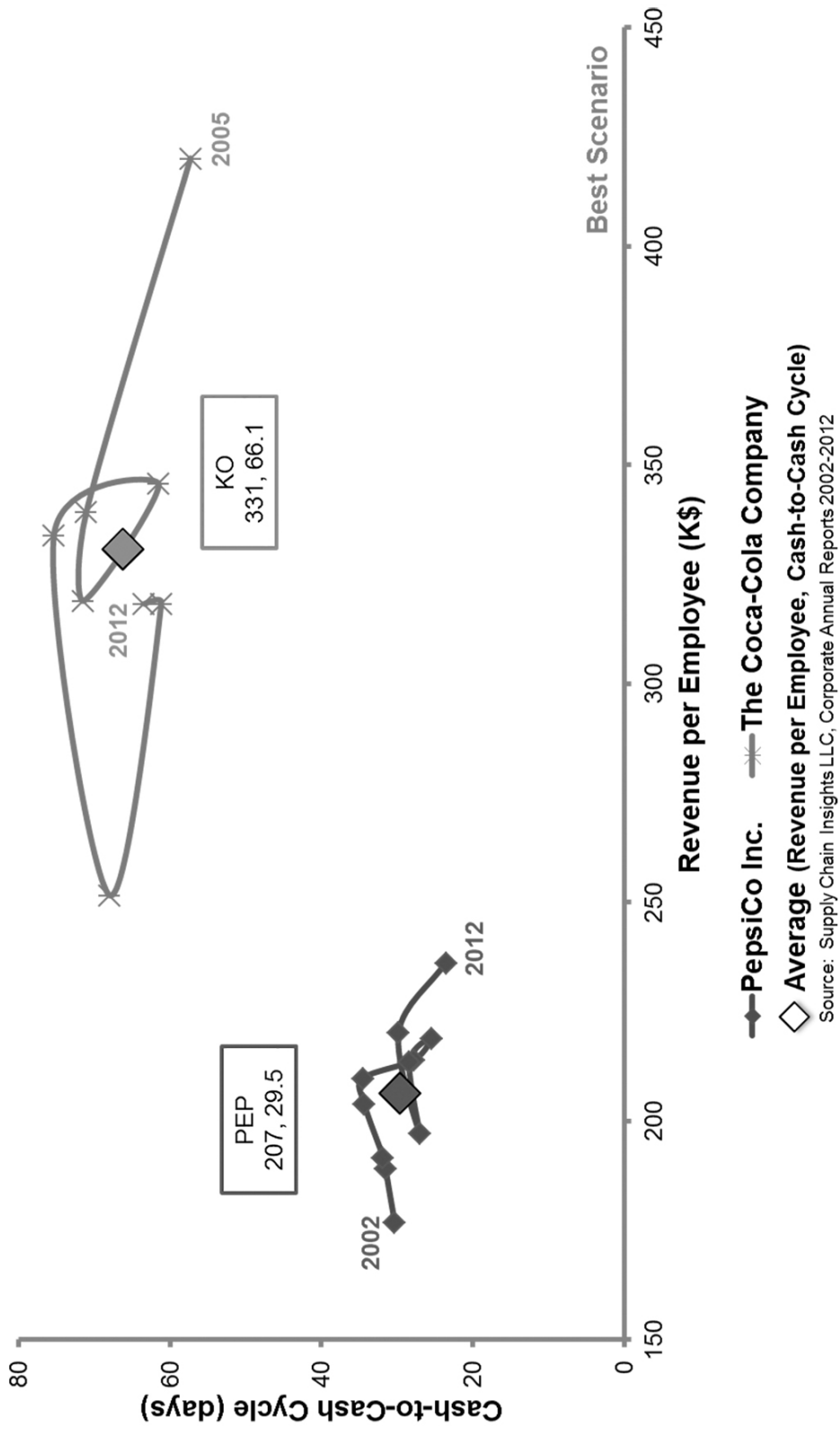
Unilever and Colgate: Two Bookends of the Supply Chain Excellence Spectrum

As I worked on my last report, I waded through spreadsheet after spreadsheet of data for three weeks, contrasting the progress of the high-tech, consumer products, food manufacturing, pharmaceutical, and industrial sectors. The highlight of the report is that only the high-tech industry is making progress on the Supply Chain Effective Frontier (effectively balancing progress on growth, profitability, cycles, and complexity simultaneously). The rest of the industries are either stuck or moving backward. Consumer packaged goods (CPG), food, and chemical manufacturers are stuck, and pharmaceutical and industrial companies are losing ground and moving backward.

As I worked with the data, several stories emerged in parallel to the main theme of the report on supply chain resiliency and the progress (or lack thereof) of companies on the path to supply chain excellence. One story that stands out for me is the race for supply chain excellence within the CPG peer group. It's a very competitive set of companies.

Overall, as shown in Figure 6, the CPG group composed of Church & Dwight, Clorox, Colgate-Palmolive, Kimberly-Clark, P&G, Reckitt Benckiser (RB), and Unilever is facing slower growth. With rising commodity prices, increasing complexity of the product portfolio, and escalating costs for transportation, the companies in this peer group are fighting to reduce costs and protect market share.

Figure 6. Growth by Industry

Year-over-Year Sales Growth (2000-2011)

Industry	Average	2000-2003	2004-2007	2008-2011
Chemical	7%	3%	8%	7%
Consumer Packaged Goods	7%	5%	11%	5%
Food	7%	10%	5%	6%
Hi-tech & Electronics	19%	13%	27%	14%
Industrial	4%	2%	6%	4%
Pharmaceutical	9%	5%	7%	12%

Source: Supply Chain Insights LLC, Corporate Annual Reports 2000-2011
Chemical: Akzo Nobel N.V., BASF SE, Eastman Chemical Co., E. I. du Pont de Nemours and Co., The Dow Chemical Co.
Consumer Packaged Goods: Church & Dwight Co., Inc., Colgate-Palmolive Co., Kimberly-Clark Corp., Reckitt Benckiser plc, The Clorox Co., The Procter & Gamble Co., Unilever N.V./PLC
Food: Campbell Soup Co., General Mills, Inc., Groupe Danone S.A., H.J. Heinz Co., Kellogg Co., Kraft Foods, Inc., McCormick & Co., Nestlé S.A., The Hershey Co.
Hi-tech & Electronics: Apple Inc., Dell Inc., LG Electronics, Motorola Solutions, Inc., Research in Motion Ltd., Samsung Electronics Co., Ltd., Seagate Technology PLC, Western Digital Corp.
Industrial: Caterpillar Inc., Ford Motor Co., Honda Motor Co., Ltd., Mitsubishi Heavy Industries, Ltd., Mitsubishi Motors Corp., Toyota Motor Corp.
Pharmaceutical: Abbott Laboratories, Eli Lilly and Co., Merck & Co., Inc., Novartis International AG, Pfizer, Inc.
*Data unavailable for H.J. Heinz Co.
*Year-over-Year Sales Growth = (revenue year y – revenue year x)/ (revenue year x)

As an industry analyst, I've worked with all of these companies over the course of the last ten years. In the process, because I hadn't done an in-depth analysis of their progress on the Supply Chain Effective Frontier, I saw each of them as equals, but they are not.

The analysis is tough. This data is hard to get. I'm only able to do it now because, at Supply Chain Insights, we invested in systems to analyze financial supply chain ratios.

Who Did It Best?

As I write this, I hang my head. Over and over again during the course of many years, I've heralded the progress of P&G on revenue per employee as a characteristic of supply chain excellence. As I pushed forward these ideas, I was challenged by Mark Vollrath of the Colgate team on the analysis I was doing. He pushed back and asked me to look beyond productivity. After an in-depth analysis of the data over the course of the last three weeks on ten years of financial ratios, I see his point. (I know, I know. I can be hard-headed at times.) I now believe that the choice of Colgate versus P&G as the winner on supply chain excellence is based on what is valued. If productivity is valued, the choice is P&G. If the definition of supply chain excellence is the balancing of costs and inventory, the winner is Colgate.

However, what's now clear to me is that, whatever the evaluative metric, Unilever is at the bottom of the CPG peer group and should never be seen as a supply chain leader. The company is at the bottom of the list in driving performance improvements in productivity, cost, margin, inventory performance, and growth. Its only improvement was an extreme increase in days of payables that improved cash to cash, but weakened its suppliers.

In Figure 7, I share insights on progress that Colgate and Unilever made during the last two years. Unilever is roughly four times the size of Colgate. In 2011, Colgate had revenue of $16.7 billion and 38,000 employees. In contrast, in 2011, Unilever had revenue of $64.6 billion and 169,000 employees. The two companies have some commonalities: both operate global teams, and each defined their supply chain organizations at about the same time. However, as anyone who has worked with both companies knows, they have very different cultures.

Figure 7. Corporate Performance: Colgate vs. Unilever

Metrics	Colgate-Palmolive Company					Unilever N.V.				
	Average	2000-2003	2004-2007	2008-2011	2012	Average	2000-2003	2004-2007	2008-2011	2012
COGS & Revenue Ratio	0.43	0.45	0.44	0.42	0.42	0.54	0.51	0.51	0.57	0.60
Days of Inventory	65	59	67	68	70	68	77	74	57	54
Operating Margin	0.21	0.21	0.19	0.22	0.23	0.13	0.10	0.13	0.15	0.14
Return on Assets	18%	17%	16%	20%	18%	8%	3%	10%	11%	9%
SG&A Margin	0.66	0.67	0.65	0.65	0.65	0.68	0.62	0.69	0.72	0.73
Year-over-Year Sales Growth	6%	3%	9%	5%	2%	4%	3%	3%	4%	2%

Source: Supply Chain Insights LLC, Corporate Annual Reports 2000-2012 from One Source
COGS & Revenue Ratio: (COGS)/ (revenue)
Days of Inventory: (average inventory/ COGS) * 365
Operating Margin: (operating income)/ (revenue)
Return on Assets: (net income)/ (total assets)
SG&A Margin: (revenue – SGA)/ (revenue)
Year-over-Year Sales Growth: (revenue year y – revenue year x)/ (revenue year x)

When I first started working with Unilever in Europe, the teams would laugh and say, "You couldn't work at Unilever without the ability to have a spirited debate." They were right. The Unilever teams in the U.S. mentioned that it was hard for them to sort through all of their "science projects," while the Colgate teams were focused on one or two major objectives.

The Unilever teams are composed of very smart people. However, they've always struggled to gain the same recognition of supply chain excellence at the board level that Colgate and P&G were able to enjoy much earlier. Unilever also relied heavily on strategic consultants, and they started many waves of independent projects. Colgate, on the other hand, was largely driven by internal leadership, with a conservative focus on supply chain basics.

The definition of "global" was also quite different for the two companies. For Unilever, the regional teams operated with a strong, independent spirit. Each region had a high level of autonomy. As I worked with them, I watched the Indian Unilever team gain a strong market presence as the market stature of the U.S. declined. Colgate, on the other hand, operated with a stronger global hand. The goal of Colgate was to get regional input, but manage a global brand presence. The focus was far more multinational.

During the Great Recession of 2007, Unilever restructured the organization, resulting in a number of layoffs. Suddenly, inventory management became very important, and the teams worked cross-functionally on working capital management. Colgate, on the other hand, withstood the market shocks better than Unilever and continued to build talent systems. The Colgate team focused on a common IT architecture, while the Unilever team allowed more freedom for project-based and functionally driven IT decisions.

In comparative analysis, I see two bookends. Over the course of the decade, Colgate maintained a margin of 21% against an industry average of 16% and drove a high return on assets (ROA) of 18% against an industry norm of 11%. The team continued to reduce costs through the recession, achieving better growth and margins with lower inventory levels than the Unilever team (the average days of inventory for the peer group are 59). They performed better than their peer group on growth. In contrast P&G, which is often touted as the CPG leader, had an average operating margin of 18, an ROA average of 9.5%, an average number of days of inventory of 65, with a growth rate of 7%.

This is in sharp contrast to the rankings when you study the three companies' performances on improvements on productivity over the last decade as measured by revenue per employee. The CPG average was $443,000 per employee. P&G was the industry leader, with an average of $532,000 per employee. Colgate was under the average at $352,000 per employee, and Unilever was the laggard at $259,000 per employee.

When I use a more holistic measurement of supply chain excellence as managing the trade-offs of growth, profitability, cycles, and complexity, Colgate and Unilever form the bookends of the CPG peer group. Colgate should be given the award for excellence, and Unilever ranks at the bottom of the pack. Sorry, Mark — you were right. This is a much better view of supply chain excellence than the easier metric that I used previously of revenue per employee.

My take? It's easier to say "supply chain excellence" than it is to define it. The definition varies by organization. It also needs to align to strategy. What works for one company may not be a fit for the other. However, I find that too few supply chain teams stop to analyze the potential of their supply chains and their progress on the Effective Frontier of managing growth, costs, complexity, and cycles.

XX and XY: A Different World in Supply Chain

The deserts of the southwest sprawl below me as the plane ascends from San Diego. It's a very different landscape than the green mountains of my farm in West Virginia or my city streets in Philadelphia. It appears barren from my window in seat 4D.

It's been a good week. I now have a working manuscript for my new book, *Metrics That Matter*. Writing it has been like a black cloud hanging over my head. Finishing it while managing a startup has been tough, but, then again, I've never been one to shy away from a challenge.

I jeopardized the release date of *Metrics That Matter* by taking an extra three months to finish work on the Supply Chain Index. The book is now 98,482 words and eight chapters. It's a fictitious story of a guy named Joe that doesn't want to be an "average Joe." He's trying to figure out the answer to these questions:

- What defines supply chain excellence?
- Who has done it best?
- How has progress changed over time? What does it mean for the future?

Since supply chain can be a bit boring, I made it into a narrative. In the story, Joe and his leadership team work together to learn the answers to these questions through a series of strategy days.

Writing a book is a bit daunting and definitely a labor of love. I've poured over digital pages on my laptop for many days. It's tough to write on airplanes. During the process, I've flown more than 120,000 miles. On the journey, I've lost five wireless mice, used over six reams of paper, and damaged three laptops. It's hard to write on the road, but I'm now down to the final editing process.

So, as my plane takes flight today, I breathe a bit better and walk a bit faster. A milestone has been completed. It's time for reflections.

Reflections

I recently facilitated a webinar for Kinaxis. The topic was on mentorship and sponsorship of women in the workplace. When the offer came across my desk, I had a "Marmaduke moment." (Remember this cartoon character? He's one of my favorites. Marmaduke is a lovely Great Dane. When he heard something startling, he would always raise his ears and make a sharp sound.)

Why, I thought, would Kinaxis be interested in doing a webinar on women in supply chain? In my opinion — and it's a very biased opinion, I admit — the role of women in the workforce in supply chain has come so far during the time of my career. There was no line for the bathroom at the Kansas City CLM conference in 2001, but there was at the CSCMP conference in San Antonio in 2013. In fact, it was a long one.

Today, based on our studies, women compose about 43% of the supply chain workforce. I was on the cusp of the transition — a first-generation female pioneer. When I went to engineering school at the University of Tennessee in 1974, there were two women in my class. I still remember a professor throwing my statics and dynamics midterm test down on my desk, marked with a red "D," and asking to see me after class (90% of the class had failed, but none of my male classmates were asked to stay). The follow-up conversation wasn't pretty. He basically told me that women didn't have the ability to be engineers.

This was a story he couldn't recount when he quietly returned my final test at the end of the term. This time, there was an "A" at the top.

The Webinar

At that time, my friends and I felt that we needed to deny our femininity to be accepted in the workforce. It was a hard battle, fought with grit, determination, and chagrin. The stories were poignant. It was before the days of sexual harassment policies, but not before sexual harassment. Being female in an all-male world was difficult — certainly not one fathers would wish for their daughters. Several of my friends ended up in therapy with an identity crisis.

Not me. I was just so busy fighting the fight that I forgot to enjoy the journey. Tough as nails and focused, I plunged ahead. There were many years that I couldn't let myself feel anything. But yesterday, as I push my manuscript to the back of my desk at the Omni Hotel in San Diego and

took a break to facilitate Kinaxis' webcast with a panel of four wonderful women, I took time to enjoy it. I heard advice that I wished someone had shared with me when I was just starting out:

- **Be thankful for feedback.** Shellie Molina, now vice president of global supply chain at First Solar, told a story of learning how to receive feedback, instructing the audience to ask for it often and thank the giver. As a crusty gal that was fighting the hard fight to be accepted in a man's world, this would have helped me immensely. I needed so much feedback, but I fought the people who tried to give it. I give thanks now to the ones who persevered. I'm a better person for it. Shellie said, "It takes guts for colleagues to give you feedback. When it happens, thank them and ask for clarity. Use it as a time to build the relationship." Great advice. Don't make the same mistake as me.
- **Outperform, and then ask for more.** When asked how to get a sponsor, Laura Dionne, director of worldwide operations at TriQuint, replied, "Outperform, and then ask for more." She shared that this had helped her get sponsorship from her managers. Laura also said that she was promoted three times while taking maternity leave to give birth to her children. It made me reflect on how important sponsorship is and how it can shape others' lives. It also made me think. As a result, I sent three thank-you notes over the weekend to my prior sponsors. I wouldn't be who I am without them.
- **Don't be afraid to be female.** Elisabeth Kaszas, director of supply chain for Amgen, shared that women shouldn't be afraid to be female in the workplace. This was advice that I sorely needed as an entry-level employee. I loved Elisabeth's perspective that women have a level of modesty and pride that helps the workforce, and that other women should encourage their women peers to speak at conferences, participate in programs, and stretch their aspirations.
- **Pull up a chair at the table.** In the practice session, the panel often talked of encouraging other women to pull up a chair to the table and participate. Verda Blythe from the University of Wisconsin spoke of building soft skills in the academic setting to help both women and men embrace diversity.

All of the panelists shared that the world today is a very different place for women in supply chain. It was their belief that the opportunity is in filling senior roles. In this regard, they weren't sure that the supply chain roles were that different from other senior roles. The facts, as the panel sees them, are that there just aren't enough senior women sitting at the boardroom table. I agree.

So, as I look from my window at the desert below, I smile. The workforce today for female supply chain leaders is no longer a barren, hostile landscape like the view stretching beneath me on my way back home. For that, I give thanks. Paving the way was hard, but I'm glad I survived. However, I'm thankful that other women won't have to face the hostility and unforgiving world in which I persevered.

Section 2:

Supply Chain Talent

Five Steps to Help Address the Talent Management Gap

Supply chain talent is a growing gap for leaders, and the impact is great. The biggest issues are in middle management roles. Let's examine some of the facts from recent research.

Today, 60% of companies have open positions. Fifteen percent of the planning positions are open for an average time of five months. An IBM survey reports that 51% of companies are seeing an increase in turnover for supply chain leaders. Have I convinced you to worry yet?

If so, let's start working on a solution. Here's a hint: it doesn't start with recruiting more college grads. There's currently a 9:1 demand-to-supply ratio for supply chain graduates, and the skill level of new hires can't stretch to fill the missing mid-management gaps.

Instead, it starts with leadership. I've been reviewing supply chain strategy documents for companies that are planning their 2014 strategies. I love talking to supply chain teams about their futures. However, I'm surprised that most companies don't see the gap in supply chain talent as a critical need to fill. The plans that they're sharing don't include the need to move aggressively on building supply chain talent. There's just no understanding that the world today is not the world of five years ago. Back then, talent was plentiful, companies could easily recruit for supply chain planners, and it was easier to attract supply chain graduates. None of this is true today.

If only more companies had the view of Mike Corbo, current leader of the Colgate supply chain team. In my recent interview with Mike, he said he spent 30% of his time on team development. Notice how talent management is at the top of his mind:

"As an organization, we believe in building talent systems and hiring from within. I take my job as the leader of the 22,000 global members of the Colgate supply chain team seriously. I oversee succession planning for the supply chain organization. When it comes to talent management, it's a 'single-threaded needle.' While I'm supported by an experienced and talented supply chain human resource team, managing talent is a large part of what I do. It takes time. It's 30% of what I do on a day-to-day basis. As a result, the reward and feedback systems for talent development are

very consistent. The leader of the supply chain team has led succession planning for the last twenty-five years.

"When people come to see me and ask for career advice, I tell them to do their current job very well. My advice is to 'get real good at something and drive value today.' I believe that success is not always about moving up. I encourage members of the team to take enrichment opportunities in other areas of the company or other geographies. But I don't want them to just spend time, I want them to contribute and learn. I believe that we should encourage people to move across the organization to get a greater understanding of the business. We do succession planning three times a year. I value cross-functional experiences.

"I strongly believe that we cannot let regions operate as islands. We hire with the expectation that people will spend time in multiple regions and multiple functions."

Five Actions to Take Now
Once companies agree that the talent gap is a problem, the next question is, "What do we do about it?" Here are five steps that I think supply chain leaders can take today:

- **Recruit heavily from engineering programs, and train new hires on supply chain concepts.** Today, many companies are competing for the same talent from the supply chain programs of business schools. An untapped and more available talent pool is in the engineering schools. These grads can be trained to fill in the process mastery gaps. While they will need to be trained on the practical supply chain processes, they understand the concepts of process systems, and have the raw talent to build both technical and process mastery. In fact, in some ways, this may be helpful, since many supply chain programs are teaching the old supply chain concepts and very functional views of the past.
- **Focus on making your team members loyal employees. Loyal and valued employees stay with organizations.** Planning roles are at the bull's eye of this "perfect storm." Supply chain planning roles have the largest number of vacancies with the longest time to source. For this reason, a perfect place to start is to make sure that your planning teams feel appreciated. Most planning teams have a low level of satisfaction because traditional processes reward the urgent, not the important. The research that Supply Chain Insights is doing strongly supports that the companies that are good at planning are better able to balance costs, inventory, and customer service.

- **Cross-train.** Enrich and improve cross-functional understandings through short-term assignments. Use the principles of co-op positions for permanent employees to give them both job enrichment and cross-functional experiences. The largest gaps are in the areas of strategy and finance.

- **Invest in learning.** In our recent studies, one-third of employees are asked to own their own training programs. We all know that training is usually the first thing that's cut in a downturn or a budgetary cycle. As my friend Marcia Conner points out so eloquently in our webinars, training isn't the same as learning. Training is only one way to learn. Build stronger teams by embracing learning as a cultural value. One opportunity to do this is through the onboarding of new employees from other companies. One mistake I see companies make over and over again is that they believe they have a clear understanding of best practices. I recently taught a class where former P&G, Unilever, and Dell employees have joined the same organization. They each believed that they understood "best practices," but were unaware of how different their understanding of processes such as forecasting, network design, inventory management, and sales and operations planning were. Each employee came with a different paradigm. Use these understandings to forge better processes. Challenge why companies operate in certain ways, and be sure to get a clear understanding of how these processes evolved based on constraints, cycles, and market shifts. Help new employees build a bridge from prior experiences to the new environment early, and encourage discussions so that the entire team can learn through the process.

- **Don't take middle management for granted.** Most organizations have programs for entry-level employees and "high performers." Most training plans take middle-management employees for granted. Don't make this mistake. Build your own learning programs to help these employees build process and technical mastery. While there are historic programs through APICS, CSCMP, and other associations, leaders such as Colgate, DuPont, and Johnson & Johnson are upping the ante to build the next generation of thinking. They feel that these training programs haven't kept pace with the needs of the industry. Partner with these industry leaders to take advantage of new ideas.

Yes, Abby, There Is a Santa Claus!

I started this blog in 2010, and have grown the readership to over 3,000 regular readers. At first, very few people would post back. (To say that the traditional supply chain audience is a bit uncomfortable with Twitter and blogging is an understatement.) As the blog matured, it attracted a different audience. I now have a number of university students of supply chain management following me. I find it very rewarding to get their comments.

A reader named Abby replied to my supply chain trends piece:

"As a current graduate student in supply chain management, I have seen significant discussion on talent management. Is this a trend that you're seeing? And can you give some advice to graduates on how to improve their skills to align with what employers are seeking? I stumbled upon your blog a couple of months ago, and have really enjoyed your perspective on the challenges and opportunities within supply chain roles."

Abby, I don't know you, but if you are the Abigail Mayer of Plymouth University, U.K., born in 1990, you are in the third generation of supply chain leaders. My generation is currently passing the baton to the second generation. I'm writing this blog post to give you, your classmates, and all new graduates advice upon entering the world of supply chain management.

Making the Transition

The term "supply chain management" isn't new. It was first used widely during the period of 1992–1995. As the baton is passed, let's celebrate the legacy.

Within the last several years, leaders such as Donald Bowersox of Georgia Tech; Dick Clark of P&G; Eli Goldratt, leader of the AGI-Goldratt Institute; Tom Mentzer of the University of Tennessee, and Stefan Theis of SAP have died. Thirty percent of the people that I'm currently conducting interviews with have retired or are ready to retire. My first words of advice to Abby and all new grads is spend time with these folks to learn about the evolution of the concepts. Understand what it was like before technology made the idea of supply chain management possible. These were the days when writing meant a pad of paper and a pencil, a presentation required the right transparencies and bulbs for the overhead projectors, the creation of a report involved lots of

Wite-Out and typewriters, and the final report was sent by interoffice mail. Calculations were done on adding machines and mainframes. The concepts of near-real-time data and predictive analytics were as much a fantasy then as Santa Claus still is today.

The second generation of supply chain professional (ages 35–50) is where we are currently seeing the greatest talent issues. This is the generation that implemented ERP, e-commerce, and advanced planning systems (APS). They were often the "boots on the ground" for the global supply chain. Many of them were pioneers, relocating their families and learning the nuances of global supply chain management the hard way.

There are too few of these trained individuals to fill the gaps of the retirees. The good news is that, if you learn fast, you can help.

Abby, we give thanks that academic programs are fueling the wave for this generation of workers, but we are unsure of what your world will look like. We think that the forecast entry-level jobs will be rosy, but we're unsure of how supply chain management practices will evolve. To help you, consider these five pieces of advice:

- **Get good at math.** Supply chain management is a world where math geeks excel. Be proud of it, but learn how to use data to drive value-based outcomes. Think analytically, and use it to influence cross-functional groups. Data for the sake of data or math for the sake of math does us no good.
- **It starts with clarity of strategy.** I can't count the number of times I hear that it's about "people, process, and technology." Yawn. I think that the real secret to supply chain excellence is alignment on supply chain strategy. If this is done right, it's the foundational building block to aligning people, building processes, and selecting technology. Without clarity on what supply chain excellence is, the world circles, functional organizations can't align, and the technologies never work. Help to forge clarity on supply chain strategy in your organizations.
- **Take what you've learned in school with a grain of salt.** No two supply chains are the same, and no one company has it all figured out. Leave school with a solid foundation of the concepts, but realize that these practices are evolving. The real world isn't as absolute as the writing in textbooks. Embrace the fact that supply chain management is ever-changing based

on market drivers. Learn to think from the outside-in. Start first with what's happening in outside markets, and then map the possibilities from the outside-in.

- **Learn to ask the hard questions nicely.** It's not a world for a "bull in a china shop," but there are a lot of paradigms that need to be broken. Learn to ask the tough questions, but with respect. Ask how processes evolved, and what they could become if we improved data quality, reduced latency, and built stronger cross-functional processes.

- **Dance within the world of gray.** In supply chain management, there are no black-and-white answers. Success happens when you can take the world of gray and see patterns, build processes, and forge bonds cross-functionally.

A few years ago, I wrote the book *Bricks Matter*. To prepare, I interviewed fifty supply chain executives. It was a time for us to reflect and give thanks for a rich career in supply chain management. Abby, I hope you have the same.

Section 3:
Interviews With Leaders

Colgate-Palmolive: A Closer Look at Supply Chain Excellence

Recently, I wrote a blog post that contrasted Colgate-Palmolive with Unilever. As a follow-up, I wanted to talk one-on-one with the two companies' leadership teams and get their insights on the ten-year comparison. Here, I share insights from Michael Corbo, the head of supply chain at Colgate.

Tell me about your job as a leader at Colgate. I'm very impressed with your organization's delivery of results over the last decade. What do you believe has driven this success?

We believe in consistency. My job starts with the shelf and service to the customer. I'm responsible for the supply chain processes that deliver the goods and services to the shelf globally. This isn't a new mission for the supply chain organization. Over the last decade, we've had consistency in leadership and purpose. Eleven years ago, we defined the supply chain organization to focus on improving processes from the customer's customer to the supplier's supplier.

As a team, we believe in funding the growth. We ask the organization to take out waste and invest it back into the business. Sixty percent of our focus goes to expanding the business or driving productivity. We partner with the business leaders.

In doing this, we want to leverage scale. We are data-driven and hold ourselves accountable to the balance sheet. We realized that, in this journey, we needed to build systems to analyze data to drive better decisions. To do this, six years ago, we built a support group of supply chain finance to support our decisions. It's a parallel group to our corporate finance group that reports directly to me.

It's easier said than done. Our business is complex. We've worked hard to get good at understanding the financial levers of the supply chain. We are disciplined in making capital investment decisions. For example, we seldom outsource manufacturing. We take pride in our innovations in manufacturing. Today, 95% of manufacturing is directly managed by the Colgate team, and we've taken steps to vertically integrate some of the operations. For example, we make the tubes for our toothpaste. This has allowed us to improve operating margin and return on assets (ROA),

but has hurt the revenue-per-employee productivity numbers in your analysis. This is a conscious choice.

You are what you measure. We manage supply chain metrics. We pay attention from case fill to the customer's customers feedback, on-time deliveries, plant efficiencies, and forecast accuracy. Success is never final.

Figure 1. Corporate Performance: Colgate Versus P&G

Metrics	Colgate-Palmolive Company					Procter & Gamble Company				
	Average	2000-2003	2004-2007	2008-2011	2012	Average	2000-2003	2004-2007	2008-2011	2012
COGS & Revenue Ratio	0.43	0.45	0.44	0.42	0.42	0.49	0.51	0.48	0.49	0.50
Days of Inventory	65	59	67	68	70	65	61	67	67	58
Operating Margin	0.21	0.21	0.19	0.22	0.23	0.18	0.15	0.19	0.20	0.16
Return on Assets	18%	17%	16%	20%	18%	9%	10%	9%	9%	8%
SG&A Margin	0.66	0.67	0.65	0.65	0.65	0.72	0.74	0.70	0.69	0.83
Year-over-Year Sales Growth	6%	3%	9%	5%	2%	7%	3%	14%	3%	1%

Source: Supply Chain Insights LLC, Corporate Annual Reports 2000-2012 from One Source
COGS & Revenue Ratio: (COGS)/ (revenue)
Days of Inventory: (average inventory/ COGS) * 365
Operating Margin: (operating income)/ (revenue)
Return on Assets: (net income)/ (total assets)
SG&A Margin: (revenue – SGA)/ (revenue)
Year-over-Year Sales Growth: (revenue year y – revenue year x)/ (revenue year x)

Thanks, Mike. These are great insights. I've written a lot about supply chain talent, and I question if it's the true missing link of the supply chain. What do you think? Do we have a talent crisis?

As an organization, we believe in building talent systems and hiring from within. I take my job as the leader of the 22,000 global members of the Colgate supply chain team seriously. I oversee succession planning for the supply chain organization. When it comes to talent management, it's a "single-threaded needle." While I'm supported by an experienced and talented supply chain human resource team, managing talent is a large part of what I do. It takes time. It's 30% of what I do on a day-to-day basis. As a result, the reward and feedback systems for talent development are very consistent. The leader of the supply chain team has led succession planning for the last twenty-five years.

When people come to see me and ask for career advice, I tell them to do their current job very well. My advice is to "get really good at something and drive value today." I believe that success isn't always about moving up. I encourage members of the team to take enrichment opportunities in other areas of the company or other geographies, but I don't want them to just spend time — I want them to contribute and learn. I believe that we should encourage people to move across the organization to get a greater understanding of the business. We do succession planning three times a year. I value cross-functional experiences.

I strongly believe that we cannot let regions operate as islands. We hire with the expectation that people will spend time in multiple regions and in multiple functions.

How do you see Supply Chain 2020?

When we were starting to plan for Supply Chain 2020, the first thing that I asked my team to do was to imagine ourselves on a beach somewhere, enjoying life. We took ourselves out of the equation and imagined how we could pass on what we have built to this next generation. We want to continue the culture.

We have significant opportunity to strengthen inventory management. We know that corporate sustainability and enterprise risk management are going to play larger roles in our future vision. I believe that we have made great progress on the integration of corporate social responsibility pro-

grams into our continuous improvement efforts. I also believe that we are making good progress in the use of digital and mobile in the factories. We want to continue these paths.

We are also trying to embrace change, asking ourselves, "What is the role of e-commerce in our future vision?" We're reconsidering the role of e-commerce (demand signals from others like Amazon or direct shipments to customers) in our supply chain. I asked my team to think harder about the management of end-to-end processes and our relationship with the shopper.

I'm excited about the future with analytics. We want to make data work for us. We want to better manage the present and shape the future. I think that the use of advanced analytics holds promise.

What advice do you have for ecosystem partners trying to help supply chain leaders move forward?

I would like for the community to work on improving the experience of using analytics. Our vision is that it would be as simple as the application on a mobile phone or downloading a digital book from Amazon. Today, we are a long way away from applications that are this easy to use. I would like to see more work on a shared vision of how we can make data work for us. We lose too much in the complexity.

Kimberly-Clark: A Demand-Driven Leader

During the course of the last six years, I've helped many companies with their demand-driven initiatives. The Kimberly-Clark organization has been my best student. The company's transformation took six years, with the results now clearly visible on the balance sheet.

The Journey

The first time I worked with the Kimberly-Clark team, it was snowing in Neenah, Wisconsin. The small heater in the local hotel room couldn't keep pace with the falling temperatures of the blinding snowstorm that happened that evening. As I pulled my blanket tight around me, I questioned why I was doing this work. Would it really make a difference?

As I stomped the snow off of my boots the next morning at the start of the strategy day, I faced a room of disbelievers. The group was skeptical. As we discussed the concepts of a demand-driven organization, they offered excuses: "You need to understand that we're different. We run large assets. Our teams make more money keeping them running. We can't be like these other companies."

The pushback was high, and the willingness to change was low. However, over time, this slowly shifted. There were three strong drivers:

- **Fierce competition** — The rise of branded generics, and the intense competition between P&G and Kimberly-Clark in the consumer products (CP) paper business, forced Kimberly-Clark to adapt. It needed to reconsider its position to be more competitive. It was a case of "when the going gets tough, the tough get going."
- **Bias to innovate** — Six years ago, the Kimberly-Clark team was an innovator in the use of RFID. The company worked through two implementations of downstream data technology, with strong insights for the team. As a member of the Midwestern data-sharing consortia between General Mills and SC Johnson, it had the benefit of networking with other supply chain leaders. The team has a strong culture of learning.
- **Goal-driven** — When I started Supply Chain Insights, I ran into Scott DeGroot, director of the customer supply chain team; Rick Sather, vice president of the customer supply chain

team; and Mike Kalinowski, director of supply chain operations, at conferences. Their presentations were all hard-hitting. The Kimberly-Clark team is bullish. It's great to see a team so positive about their accomplishments. They had set a target to improve top-line revenue over the course of five years. The focus was on the channel sell-through of products. It was their BHAG (Big Hairy Audacious Goal). At first, they were nervous because the goal was so aggressive. But in the end, they beat it. They measured out-of-stocks at the shelf and made improvements. The current focus is on store-by-store productivity and the design of the supply chain from the outside-in.

Figure 2. Corporate Performance Changes Inventory Turns Versus Operating Margin
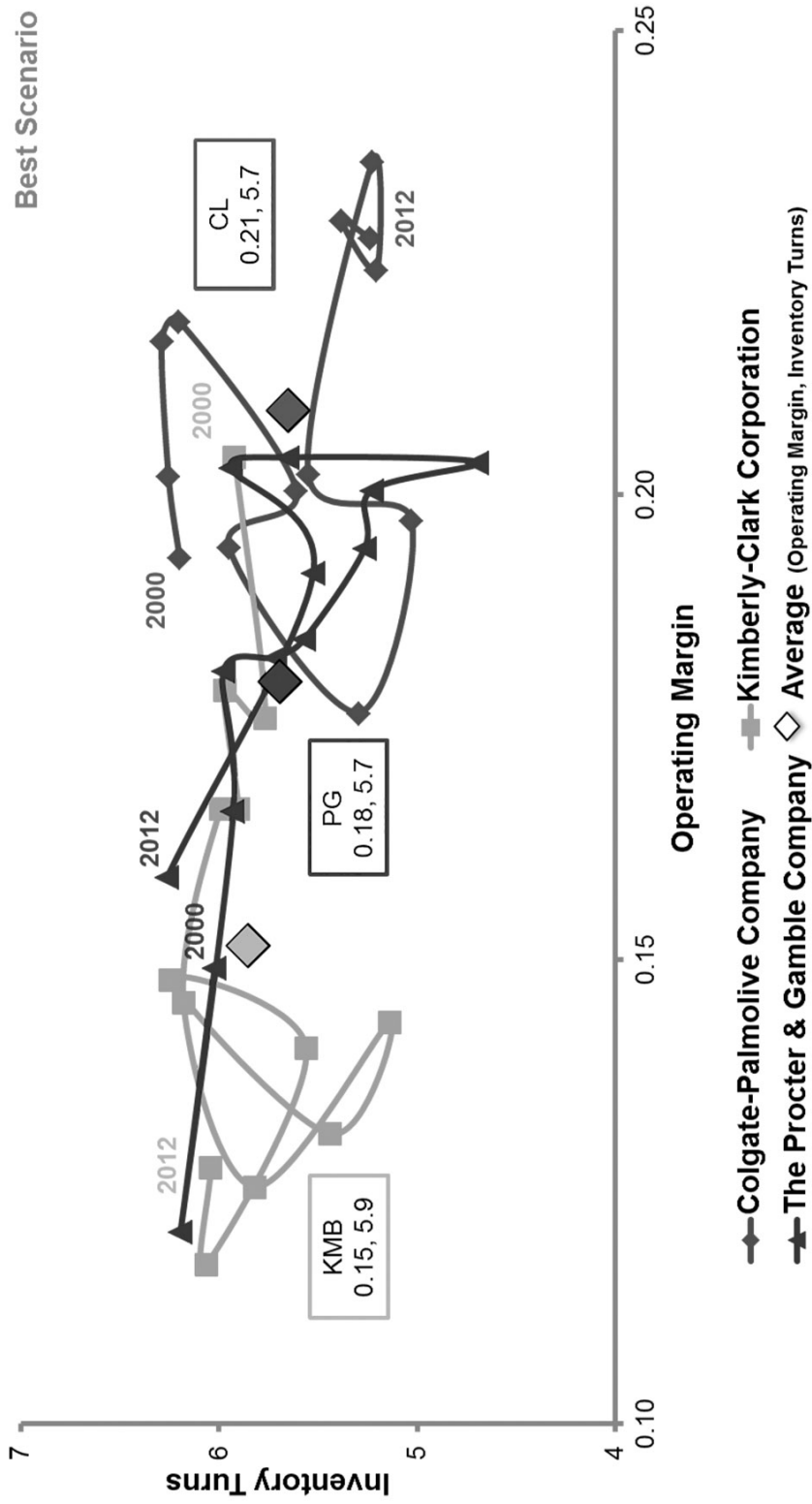
Source: Supply Chain Insights LLC, Corporate Annual Reports 2000-2012 from One Source

Why It Matters

In the Supply Chain Metrics That Matter figure (see Figure 3), we can clearly see that "operating margin" and "days of inventory" (or inventory turns) matter to public financial performance. Figure 3 shows a comparison of three CP manufacturing leaders — Kimberly-Clark, P&G, and Colgate — on driving year-over-year performance. Note the trends in operating margins and inventory turns.

Figure 3. Corporate Performance Comparison: Colgate-Palmolive, Kimberly-Clark, and P&G

Metrics	Colgate-Palmolive Company					Kimberly-Clark Corporation					The Procter & Gamble Company				
	AVG	2000-2003	2004-2007	2008-2011	2012	AVG	2000-2003	2004-2007	2008-2011	2012	AVG	2000-2003	2004-2007	2008-2011	2012
COGS & Revenue Ratio	0.43	N/A	0.44	0.42	0.42	0.67	N/A	0.68	0.68	0.67	0.49	N/A	0.48	0.49	0.50
Days of Inventory	65	59	67	68	70	62	61	63	63	60	65	61	67	67	58
Operating Margin	0.21	0.21	0.19	0.22	0.23	0.15	0.18	0.15	0.13	0.13	0.18	0.15	0.19	0.20	0.16
Return on Assets	18%	17%	16%	20%	18%	10%	11%	10%	9%	9%	9%	10%	9%	9%	8%
SG&A Margin	0.66	0.67	0.65	0.65	0.65	0.83	0.83	0.83	0.82	0.81	0.72	0.74	0.70	0.69	0.83
Year-over-Year Sales Growth	6%	N/A	9%	5%	2%	4%	N/A	6%	3%	1%	7%	N/A	14%	3%	1%

Source: Supply Chain Insights LLC, Corporate Annual Reports 2000-2012 from One Source
COGS & Revenue Ratio: (COGS)/ (revenue)
Days of Inventory: (average inventory/ COGS) * 365
Operating Margin: (operating income)/ (revenue)
Return on Assets: (net income)/ (total assets)
SG&A Margin: (revenue-SG&A)/revenue
Year-over-Year Sales Growth: (revenue year y – revenue year x)/ (revenue year x)

To understand supply chain performance, companies need to be compared with their peer group. If not, it's hard to get context on the meaning of the data.

In the Supply Chain Index (the correlation of supply chain ratios to market capitalization) for CP companies, operating margin represents 7% of the impact, and inventory management represents 9%. Over the past twelve years, Colgate clearly outperformed against the peer group on operating margin, but is not making progress on inventory. In contrast, over the last five years, P&G and Kimberly-Clark have both struggled to maintain margins. Each faces four years of deterioration on this important supply chain metric. However, based on its work in becoming demand-driven, in the past year, Kimberly-Clark has improved both margin and inventory turns. 2012 was its fourth consecutive year of making improvements in inventory management.

An Interview With Rick Sather

I interviewed Rick Sather, Kimberly-Clark's vice president of customer supply chain, on these improvements. I wanted to gain his insights on the company's demand-driven journey.

Rick, you've been able to add revenue to the top line and beat your goals. What made you successful?

We've successfully added millions of dollars to net sales. I can't give you a definitive number. The question of how long it took is difficult. We had accumulated learning with a couple of customers. We learned in Year One and then applied this accumulated learning in Year Two to make a substantial difference. In four years, we delivered what we feel is "breakthrough innovation." In the last two years, our results have been in excess of the goal. Every time that we look at the opportunity before us, we see more value than we ever first imagined. We believe that there's a lot of fruit on those vines.

What have you learned?

Small format is a big opportunity. Today, retailers have a large store count with increased velocity. We have a diffusion of inventory in the channel with excess and shortfalls. Not every retailer is at the same place. Imagine that you have several thousand locations and you have an event coming. We learned to adapt quickly. We needed to plan strategically and then review promo-

tional events on a daily basis. The response needed to be outside-in. I feel that more and more of the industry, over time, will look at a smaller batch more frequently.

We learned through experimentation. If you make a big bet and you're wrong, you lose a lot of time. New forms of analytics allow you to do this. There's a lot of old thinking about what's happening on the consumer side and the speed of that changing. Technologies are becoming more user-friendly.

This is worth multimillion dollars of savings and top-line sales benefits. With one customer, focusing on a few items' promotional event — where we had too much in one store and were out-of-stock in others — resulted in multimillion dollars of sales. Our problems are limited bandwidth and having insights that are actionable.

Information and collaboration to make the right decisions are more important. Bandwidth is enormous. It's not a question of how can we drive it deeper and further. We now have data. We have to focus on removing the handoffs.

It's about flow. There are a lot of barriers to flow. Companies have been on a lean journey. Historically, it has been "take a production line and change how we think about it." At Kimberly-Clark, we were masters of big-batch thinking. Let me give you an example of small and frequent analysis in a repeatable cycle. We've translated it into everything. We used to look at damage in distribution centers one time per month. We now look at it every day in every location. We have reduced our damage by 50%. It's a big mind shift.

The traditional ERP/MRP logic is a barrier. Companies need to move to flow logic — small batches done frequently based on pull.

Another example is the work that we're doing on collaborative shipping. We are a high-bulk, low-weight, and high-frequency shipper. We're looking to marry up with other shippers with higher weight and lower velocity. There is a double-digit opportunity in costs. We're experimenting. It's great learning, but we have a need for some infrastructure changes. Retailers and shippers have their own master data systems. We need a breakthrough technology to change how we map data.

Figure 4. Overview: Kimberly-Clark's Demand-Driven Journey
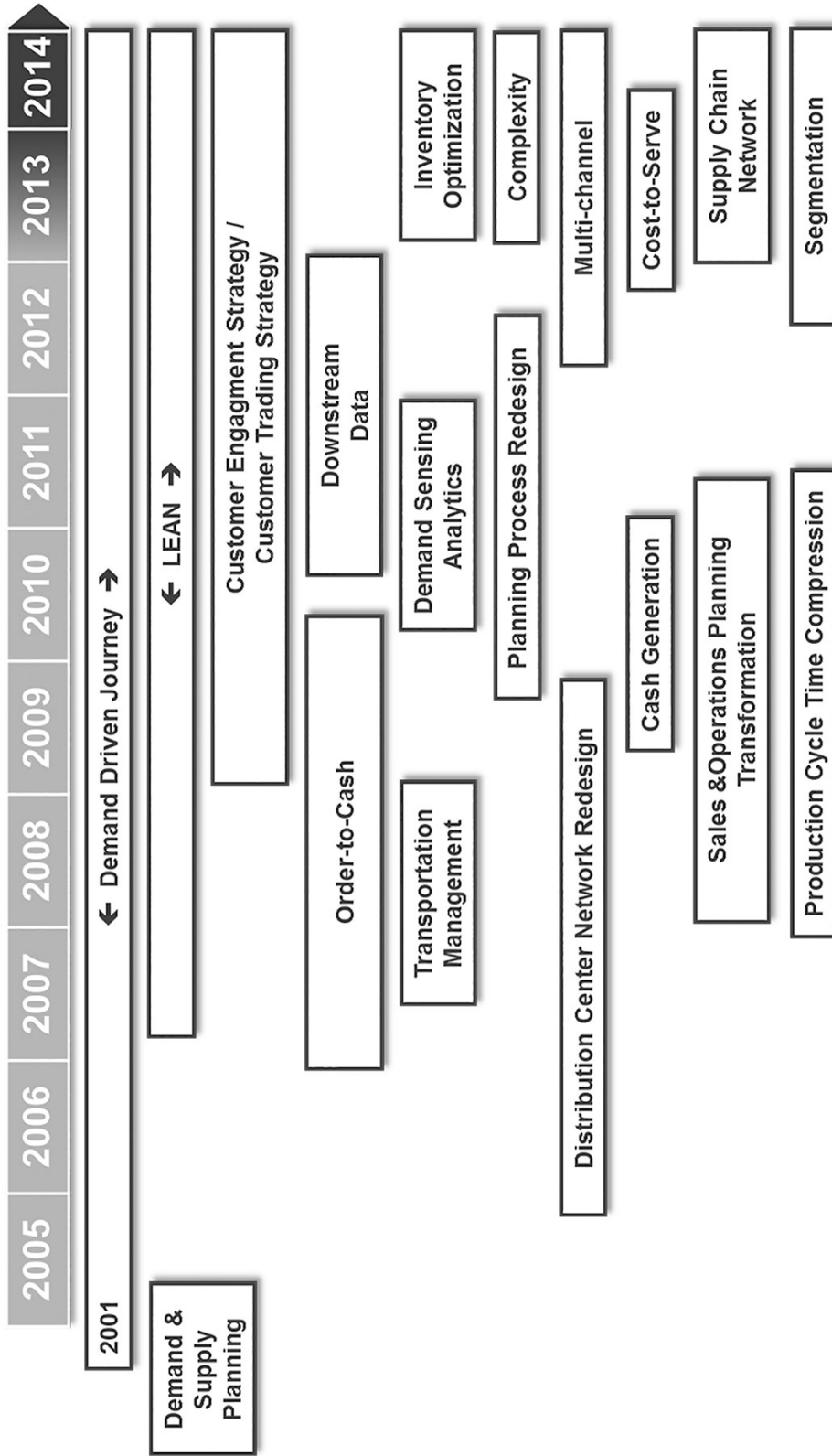
Source: Kimberly-Clark Presentation at Supply Chain Insights Global Summit (September, 2013)

What excites you?

There's no one technology that excites me. What I find exciting is bringing all of the technologies together. I think that the market is ready for breakthrough innovation. I recently changed the vendor-managed inventory (VMI) software and moved to Datalliance. We're working with third-party logistics solution providers to implement collaborative shipping. We want to tie VMI and collaborative shipping together. Terra Technology and the use of its demand sensing is helping us drive a better demand signal. I think that it's a combination of VMI, forward-looking forecasting, and analytics. We need to bring these processes together from the customer back into the traditional supply chain.

Closing Thoughts

As I think about Kimberly-Clark, I'm proud. The company took the demand-driven lessons to heart. As others aspire to make a similar difference in their balance sheets, I have three closing thoughts:

- **Use of downstream data** — Kimberly-Clark actively works with downstream data. While other companies talk about it, Kimberly-Clark is aggressively using it. The team shares and uses point-of-sale data with 80% of its customers (based on volume). The company is an innovator. For example, it was a leader in the implementation of Terra Technology's MDS product, with 31% improvement in demand planning seven days out on the horizon. Kimberly-Clark implemented the Terra Technology MDS product the fastest of any CP leader that I've followed. The biggest impact of this forecast improvement is better decision making on new product launch planning and replenishment.
- **Driving innovation** — Kimberly-Clark has partnered with Colgate, and is leading an initiative for collaborative, multiparty shipping. The company has the courage to push a new industry model.
- **Reduction of inventory** — Note the recent improvements in the Kimberly-Clark inventory cycle in Figure 3. The change is year over year. Although Kraft moved on a similar pattern of technology adoption and discussions of downstream data, Kimberly-Clark made progress while Kraft did not.
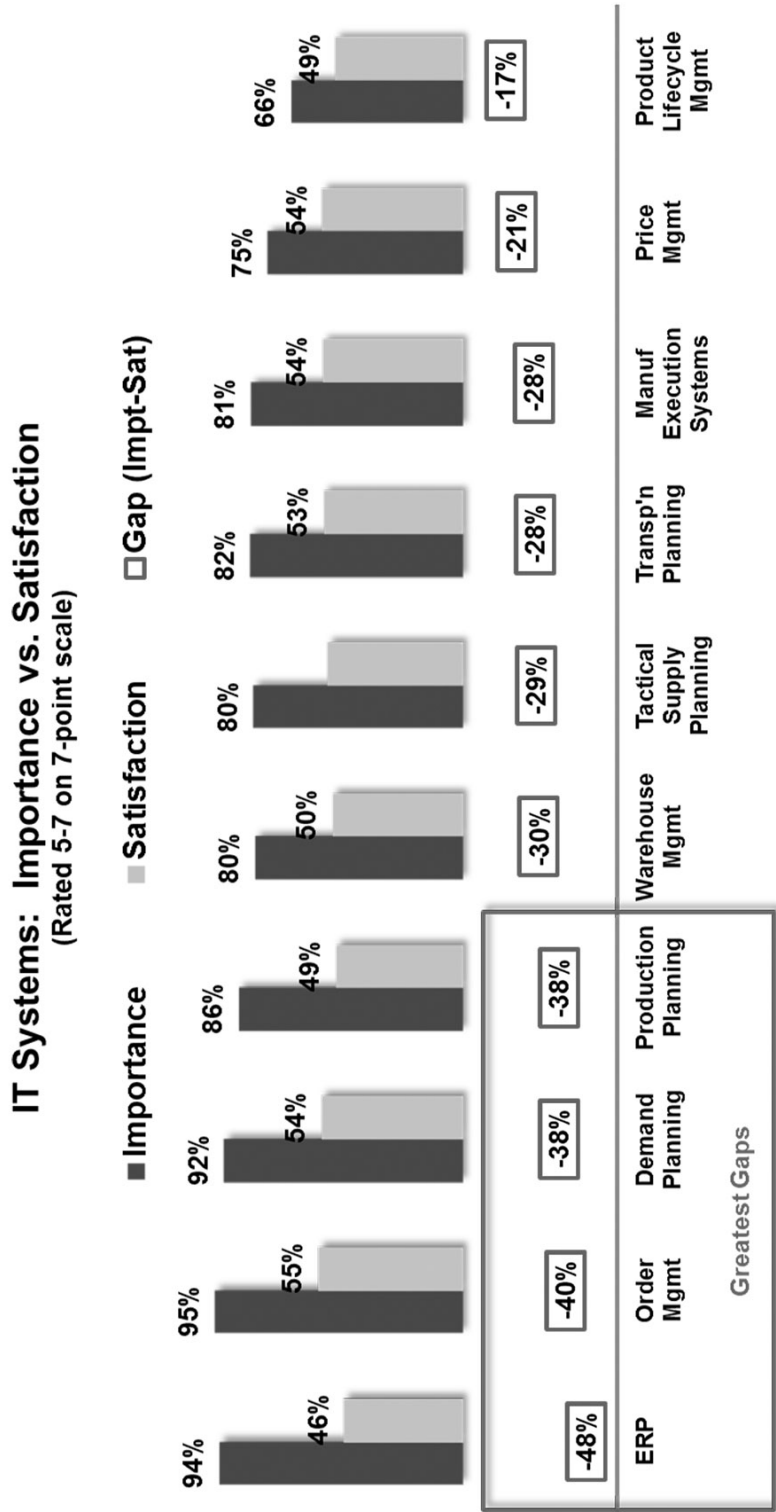
Amway: Redesign to Improve Value

I spoke at LLamasoft's conference on improving supply chain network design. I'm also busy writing a report on the state of supply chain planning (SCP). While other analysts may put the vendors into a four-square evaluation model and declare it "magic," I think that this approach does a disservice to the industry.

Why do I feel this way? Because the SCP market is a fruit basket of vendors with very different capabilities. It can't be adequately equated in a four-box model. The capabilities are just too different. (Bear with me on this rant. This old gal has built hundreds of four-box models in her decade of being an analyst.)

By and large, no one is happy with SCP as it exists today. In Supply Chain Insight's recent study "Voice of the Supply Chain Leader," we found that the gaps are large and growing. As shown in Figure 5, the gaps with the major categories of SCP are great. I recently presented this slide to a group of consultants, and a person in the audience raised his hand and said, "Lora, let's just face it. No one likes what we have today. This slide supports that what we have today just sucks. What can we do about it?"

Figure 5. IT Systems: Importance Versus Satisfaction

IT Systems: Importance vs. Satisfaction
(Rated 5-7 on 7-point scale)

■ Importance ■ Satisfaction □ Gap (Impt-Sat)

System	Importance	Satisfaction	Gap (Impt-Sat)
ERP	94%	46%	-48%
Order Mgmt	95%	55%	-40%
Demand Planning	92%	54%	-38%
Production Planning	86%	49%	-38%
Warehouse Mgmt	80%	50%	-30%
Tactical Supply Planning	80%		-29%
Transp'n Planning	82%	53%	-28%
Manuf Execution Systems	81%	54%	-28%
Price Mgmt	75%	54%	-21%
Product Lifecycle Mgmt	66%	49%	-17%

Greatest Gaps

My advice to him, and to all my readers, is to focus on what drives value. The gaps in our technologies are a barrier, but shouldn't stop us from redesigning to improve performance.

Although innovation has slowed in enterprise resource planning (ERP) and SCP, I'm bullish about some of the innovation coming from the supply chain network design technology providers, such as JDA Software, LLamasoft, and Solvoyo. These tools are now enabling new capabilities to make trade-offs between volume and cost while helping companies to redesign flows and decoupling points. I also think that Quintiq's leadership in concurrent planning to solve new problems is promising, especially in the design of transportation and inventory flows.

Interview of a Supply Chain Leader: Redesigning for Value

While technology is both an enabler and a current barrier, for me, the journey is less about technology and more about leadership. One of my favorite interviews on this topic, which I recently completed for my upcoming book *Metrics That Matter*, was with Amway's Chief Supply Chain Officer George Calvert. He's the head of operations for the direct-selling leader of health, beauty, and home care products. Amway had just implemented a number of changes and were proud of its progress.

Here are some excerpts from the interview:

Tell me about yourself.

My path into managing operations is different than most because of my background in chemistry. The path I took came through R&D where I had many different roles, including R&D management and quality assurance. When my boss retired, I took over the combined functions of R&D and supply chain operations. You don't often see R&D and operations together, but for me, it's a perfect fit.

My skill set is really more focused on pattern recognition, and operations is a numbers-based business, making it easy to do in supply chain. I look at patterns to construct business models to deliver on efficiency and effectiveness.

What have you learned?

Before we took on the supply chain redesign, we had a whole series of ideas that we thought we should be doing. When we started, we developed this big list of ideas on things that we could do. Turns out many of the ideas were wrong because they weren't based on fact, just perception.

It wasn't that easy. In researching the ideas, such as moving a business to the point of sale, we discovered that the base numbers of the business revealed new strategies. For example, we discovered that transportation and duties are five times the expense of labor and overhead. This is a very different mix of inputs than the garment industry where labor would be a major driver. The opportunity was in reducing the transportation and duty cost, not in moving to low-cost labor markets.

In prestige beauty and nutritional supplements, the cost to ship the product is minuscule. The product is light, compact, and high value. However, this is a different story in home care, where an item is mostly water. As a result, we had to analyze what the drivers were of the supply chain cost, and what the opportunities were by business line that were unique to our model.

We found that, in addition to each country's nuances, each business line had specific requirements. For example, people want prestige beauty from the U.S., Europe, or Japan. Customers aren't looking for prestige beauty from the emerging economies. Take another example — few people know where their TV was made, but the buyer cares greatly about the reliability of that product. Product reliability, in the case of durable goods, is the driving factor for product satisfaction. So, when you're designing your supply chain, it's just as important to analyze distribution costs, material variability, and the costs of labor, along with the perception the consumer has on the country of origin. Through this analysis, you can develop an effective and efficient supply chain.

How did you redesign to improve value?

It took six to nine months to look at the numbers. To do this, great modeling is critical. The strength of your decisions is directly dependent on having accurate data. For example, we produce in Vietnam and China. We produce there because the regulations say that you need to manufacture there to sell there. Vietnam is a low-cost market to produce products. Our factory is efficient, yet it costs us more to manufacture the product in Vietnam because of a lack of local raw materials, compared to manufacturing it in the U.S., shipping it, and paying duties on a landed

basis. You have to have a model that helps you see the inter-relationships. Free-trade agreements also matter. In our business, there isn't one lever. There are twenty levers.

Our operations serve the globe. We're in one hundred countries and territories around the world. Our activities are broad. We're engaged in everything from raising crops to making home deliveries.

Service level is our most important metric. If someone is building an Amway business, he or she may choose to primarily focus on selling water treatment systems. If we don't have them in stock and available, that Amway business owner is out of business. We must be responsive to demand and be diligent to reduce demand interruptions. We must also have a consistent supply of quality product. As a result, our focus is to make it right the first time. Reliability in both of these metrics is critical.

Most companies inherit supply chains. To a great extent, we inherited the supply chain that we had. When we got into it, some things didn't make sense. If you're not going to add value, why do it yourself? The question we always asked was, "Why?" For example, we made our own corrugated packaging. The equipment was twenty-years-old. It didn't make sense, so we outsourced it and focused our efforts on what we're good at: nutrition, beauty, and home/personal care products.

We invested where it made sense. We grow and process many of our own crops. Our investment focus shifted to getting the right seed, controlling the planting, and ensuring quality conversion all the way through finished products. We have three large-scale farms heavily invested in the production of botanicals and an ongoing $332 million manufacturing expansion supporting the many new nutrition plants needed to support our growth.

What suggestions do you have for others?

Communication to the work teams is critical. Go slow and be clear. Don't expect that something that took you nine months to figure out is going to be effectively communicated in one meeting. It has to be communicated in the right way. Our restructuring of operations meant a lot of communication. We believe in transparency, and we told people why we were making the decision and shared the drivers. We were going to invest where it made sense.

My second suggestion to other supply chain leaders is to seek to understand your model and the fundamental drivers of your supply chain. Find out what it is. Is it labor? Is it duties, or maybe transportation? Actively define efficiency and effectiveness. We started with consultants, but we kicked them out after a few days. I trusted my team to know the business. Collecting the data isn't easy. I suspect that many companies have great capabilities to get data, but we didn't. We spent the time to overcome our data challenges. We made better decisions doing it ourselves because we know the business. We weren't impatient. We asked ourselves hard questions. I think that our results are better because of it.

Section 4:

Examining Demand

Learning to Speak the Language of Demand

New shoes feel awkward. Blisters appear. Feet hurt. We wear them only for short periods, and often shelve them to allow our feet to recover. However, over time, they slowly feel comfortable and eventually become a part of our wardrobe.

Learning to speak a new language is similar. Conversations are strained, mistakes are made, and pauses are awkward. Confusion reigns. It takes time, but slowly, the words flow together seamlessly.

Nine out of ten supply chains are stuck. Growth has slowed. Complexity has increased. Companies are jammed at the intersection of inventory turns and operating margin, unable to drive improvements in either area. The secret to unsticking the supply chain is to redesign processes from the outside-in — from the market back.

This a step change, not an evolution. Why? Most companies have designed supply-centric processes from the inside-out. The first step to making the shift is learning a new language.

Step Up and Learn the Language of Demand

In companies, there's no standard model for demand processes. It's evolving, with new forms of analytics making new capabilities possible. In the traditional organization, some demand processes are sales-driven, while others are marketing-driven. However, sales-driven and marketing-driven processes are quite different from market-driven processes.

Unfortunately, companies have invested money in traditional forecasting processes, believing that, if they make the forecast better, corporate performance will improve. But improving forecasting isn't sufficient. It's about much more than conventional forecasting. While we need forecasting and we need to improve the processes, we also need to teach teams how to use new forms of demand data and to adopt demand processes.

Why is this important? Supply chain leaders are fluent in the language of supply, but they don't know the language of demand. To become demand driven (or market driven), they need to learn

how to speak a new language. In this process, they slowly learn that the customer order is a poor representation of demand.

New Terms to Know

The concepts of demand-driven are now vogue. Many supply chain consultants will quickly rattle off case studies and proof points, but the smart supply chain leader will ground the discussion with clear definitions:

Demand Consumption

The translation of the demand signal across planning horizons. In early planning products, this was accomplished through rules-based consumption. New and more advanced technologies are using optimization and cognitive learning techniques to consume the forecast across planning horizons.

Demand Latency

The latency of a demand signal due to demand translation of a customer purchase through the supply chain to an order for a trading partner. The time is different in each supply chain based on product sales velocity and the technologies used. For example, in a hospital, it's the translation of usage in a procedure from hospital order to a distributor, and the translation of that usage to an order for a manufacturer. This time lapse varies by product and channel. For the purchase of Tide at Walmart to translate to an order at P&G, the time is five to seven days. The translation of a purchase of Aleve at a retail outlet store to Bayer, the manufacturer, is sixty days. As the long tail (small orders shipped with low frequency) of the supply chain grows, demand latency increases, and there's a greater need for demand-sensing technologies.

Demand Sensing

The reduction of time to sense purchase and channel takeaway. Demand sensing is a process, automated by technology, that reduces demand latency.

Demand Shaping

The use of demand tactics — price, sales incentives, marketing programs, new product launch, promotions, and assortment — to increase baseline forecasting.

Demand Shifting

The shifting of demand from one period to another (examples include pre-shipments at the end of the quarter, stuffing the channel to get rid of stock, or shipping early) increases supply chain costs and distorts the demand signal. Try to minimize demand shifting and maximize the value of demand shaping. Get clear on the difference.

Demand Synchronization

The demand signal must be connected from node to node in the supply chain, and then synchronized and mapped. The most frequently mapped data elements are product hierarchies, time/calendars, and locations. In this mapping, the data granularity and frequency must be harmonized.

Demand Translation

The translation of demand by role within the organization. Each role — customer service, sales, procurement, and manufacturing — has a different need/definition for the demand signal.

Demand Visibility

The translation of demand by role across the organization, and across tiers and nodes of the supply chain.

Dependent Demand

The translation of this demand signal from a channel demand signal to a manufacturer or a distributor through a bill of materials, or transportation or manufacturing routing.

Downstream Data

Use of channel data (point of sale [POS] and warehouse withdrawal) to sense channel demand.

Forecastability

The mathematical determination of ease of forecasting (the determination of the probability of demand). Many technologies include this in the base software package.

Forecast Value Add (FVA)

A methodology for continuous improvement of the demand plan, where steps of the process are evaluated and the following question is asked: "Did this change improve the forecast (bias and error) as compared to the naïve forecast?"

Harmonization

Data harmonization enables the data of different granularities and data structures to be harmonized into a common database.

Independent Demand

The purchase of a product by a customer in the channel.

Integration

Close coupling of the data elements to use the data in software. Integration without synchronization and harmonization does little for the demand signal.

Naïve Forecast

The historic forecast using prior-month shipments.

Seven Demand Management Mistakes of the Last Decade

Within an organization, the words "demand planning" stir emotions, and usually not mild ones. They are, just to name a few, anger, despair, disillusionment, or hopelessness. Seldom do we find a team excited about demand planning. Supply chain leaders want to improve it, but aren't optimistic that they can make positive changes.

After two decades of process and technology refinement, excellence in demand management still eludes supply chain teams. It's the supply chain planning application with the greatest gap between performance and satisfaction, and also the area with the greatest planned future spending. For most teams, demand planning is a conundrum — a true love/hate relationship.

As shown in Figure 1, demand planning is important to supply chain leaders, but also an area with very large gaps in user satisfaction.

Figure 1. IT System Importance Versus Satisfaction

IT System Importance vs. Satisfaction
(Rated 6-7 on 7-point scale)
Fall 2012

■ Importance   ■ Satisfaction   □ Gap (Sat - Impt)

	Enterprise Resource Planning	Order Management	Demand Planning	Production Planning	Manufacturing Execution Systems	Warehouse Management	Tactical Supply Planning	Transportation Planning	Price Management	Product Lifecycle Management
Importance	74%	74%	62%	59%	59%	58%	53%	53%	46%	32%
Satisfaction	23%	31%	35%	22%	24%	30%	17%	35%	21%	18%
Gap	-51%	-44%	-27%	-38%	-35%	-27%	-37%	-18%	-25%	-14%
Base: Have System	37	39	39	24*	30	37	34	22*	33	34

Most Important but Greatest Gap

Source: Supply Chain Insights LLC; Voice (Wave 2: Oct-Dec 2012)
Base: Manufacturers and have 1+ Operational IT System (varies by system) *CAUTION: SMALL BASE SIZE
Q16. How important are each of your current IT systems to your supply chain organization? SCALE: 7=Extremely important – 1=Not at all important
Q17. How satisfied are you with each of your current IT systems shown below? SCALE: 7=Extremely satisfied – 1=Extremely dissatisfied

In our research at Supply Chain Insights, we find that demand planning is the most misunderstood of any supply chain planning application. Companies are the most satisfied with warehouse and transportation management, and the least satisfied with demand planning.

Teams are also confused on the process. What drives excellence in demand planning has changed, and well-intentioned consultants give bad advice. Here, we share insights on the current state and give actionable advice that teams can take to make improvements now.

Why It Matters More Than Ever: Facing the Supply Chain Plateau

Supply chain management (SCM) concepts are now thirty-years-old. The first use of the term "supply chain management" in the commercial sector was in 1982. Previously, the focus was on a more siloed approach to improving manufacturing, procurement, or logistics. When they were lumped together, the concepts of demand planning and integrated supply chain planning were born.

T

he first demand-planning applications were introduced late in the 1980s. Today, most supply chain professionals believe that supply chain planning solutions have driven steady progress to reduce costs, improve inventories, and speed time to market. What we find is that we've actually moved backward over the course of the last ten years on growth, operating margin, and inventory turns. We've improved days payable, but this has pushed costs and working capital responsibility backward in the supply chain, moving the costs to the suppliers.

To move forward, we have to admit the mistakes of the past. In this journey to sense and shape, and to use demand information to drive a more profitable response, leaders must confront a number of mistakes made in the design of demand processes over the course of the last decade.

Here are the seven we see most often:

One-Number Forecasting

Well-intentioned consultants tout the concept of one-number forecasting, and eager executives drink this magic elixir, realizing far too late that this idea is a hoax. It's overhyped and too simplistic. As a result, the concept adds, not decreases, forecast error. The people who push the concept of one-number forecasting don't understand demand planning.

A demand plan is hierarchical around products, time, geographies, channels, and attributes. It's a complex set of role-based, time-phased data. Because of this, a one-number thought process is naïve. An effective demand plan has many numbers that are tied together in an effective data model for role-based planning and what-if analysis.

A one-number plan is too constraining for the organization. A forecast is a series of time-phased numbers that are carefully architected in a data model of products, calendars, channels, and regions. The numbers within the plans have different importance to different individuals within the organization. So, instead of one number, the focus needs to be a common plan that includes marketing, sales, finance, and supply chain views, as well as an agreement on market assumptions. This requires the use of an advanced forecasting technology and the design of the system to visualize role-based views that can only be found in the more advanced forecasting systems.

Consensus Planning

In the last ten years, the concept of consensus planning was advanced by the industry with the belief that each organization within the company could add insight to make the demand plan better. The concept is correct, but, for most, the implementation was flawed. The issue is that most companies didn't hold groups within the organization accountable for bias and error. Each group within the company has a natural bias and error based on incentives, and unless the process has discipline around this reporting, the process of consensus forecasting will distort the forecast and add error, despite well-intended efforts to improve the forecasting process.

I've worked with one company that redesigned its collaborative demand-planning processes three times. Each time, it was done to improve the user interface and make data collection easier for sales. Not once did the company ever question the value and appropriate use of the sales input, or apply discipline on the input that was driving a 40% forecast over-bias. I struggle with why more teams don't apply the principles of lean to the consensus planning process through forecast value analysis.

Collaborative Planning Forecasting and Replenishment (CPFR)

This process was the most widely adopted in the consumer packaged goods industry. It was designed for manufacturers to collaborate with their retail partners on the building of a demand plan for the extended network, as well as to align the manufacturer's demand plan to the retailer's and

reduce the bullwhip effect. The assumption was that the retailer's forecast would provide better insights.

The maturity of the retailer forecast was never considered. The issue is that the majority of retailers have poor forecasts, and the process never accounted for the inherent bias and error of the retailer forecast. When a consumer products company measures forecast accuracy and holds retailers accountable for bias and error, there is usually only one retailer that measures up to the test and requirements of CPFR: Walmart. For the rest, the process of CPFR has increased demand error. Bad inputs lead to a bad output.

Data Model Design: Forecasting What to Make Versus Forecasting Channel Demands

The traditional technique is to forecast what manufacturing should make. This has changed to modeling what's being sold in the channel. Although it may sound trivial, this difference is major, requiring a step for demand translation. Forecasting channel demand reduces demand latency and gives the organization a more current signal. It also allows the forecast to be augmented with demand insights to improve its quality. For most companies, this requires a reimplementation of demand-planning technologies.

Rewarding the Urgent Versus the Important

Time after time, we see companies implement demand-planning technologies and improve forecasting processes, but not the overall results of the supply chain. The issue is the lack of training on how to use the better forecast signal. Most supply-centric teams aren't clear on this process. They see it as a set of numbers to be tightly integrated, whereas the more mature teams see it as probability of demand to be used in their network design and supply planning models. For them, it's not so much about the specific number of demand, but the demand pattern and the probability of demand.

"Eighty Percent Is Good Enough"

When it comes to a demand-planning implementation, the devil is in the details. Seasonality, causal factors, usability, and the depth of predictive analytics are critical. This can only be determined through the use of software in conference room pilots. Unfortunately, teams rush to implement versus spending time to understand the capabilities of the different packages. The best teams carefully evaluate the pros and cons of forecasting packages through testing in conference room pilots.

Focusing on "Sell Into" the Channel Versus "Sell Through"

Most organizations are only looking at the modeling of "sell into the channel" versus "sell through the channel." By sensing demand at different channel points and managing the inventories in the channel, manufacturers can avoid returned products and obsolescence. At a recent Institute of Business Forecasting (IBF) conference, I listened to a leader of a mature demand-planning process speak. His comment stayed with me: "I can always get better on demand planning. We can work on this over time. However, time is of the essence to measure the velocity of product movement of every channel buffer point. If we screw up the management of inventories and the sensing of new product launch, it's the difference between success and failure."

So many times, the concepts of demand planning are seen as passive and detached from the organization. In this case, the supply chain leader took ownership of channel demand through the channel, and has gotten promoted three times since I saw him at the conference. The shift is invaluable to the organization.

Trading Places

The storyline was the central theme of the 1983 American comedy titled *Trading Places*, starring Dan Aykroyd and Eddie Murphy. Remember it? It was one of my favorites: a funny movie where an upper-class commodities broker and a homeless street hustler switch roles when they're unknowingly made part of an elaborate bet.

It's an ageless theme: a less fortunate character trades places with a more fortunate one. As a child, I was enthralled as I saw it play out in Mark Twain's *Prince and the Pauper* and Disney's *The Parent Trap*.

While all these stories are fictional, I recently found a story where it happened in real life. Some of my favorite supply chain management (SCM) leaders — organizations that I've worked with for over seven years — unknowingly traded places in organizational capabilities to forecast demand. Here, I share what made the difference.

Prelude

Before I tell the story, let me share a quick perspective on what I've learned about benchmarking demand metrics. I've been working in this area — one of the hardest in the supply chain to benchmark — for seven years. Of all the supply chain metrics, it's the bad apple. However, for most companies, it's the most leverageable metric, making it the *big* apple.

While companies eagerly want demand data and to improve their processes, benchmarking forecast accuracy is difficult. Why is it so hard? Let's start with the two major reasons:

Reason No. 1: It's Hard to Get "Apples to Apples" Because It's a Fruit Basket

Every company does it differently: different hierarchies, different frequencies, and different measurement systems. It's the most inconsistent area in the supply chain to benchmark.

When doing this type of work, it's essential to have an apples-to-apples comparison. To do this, you need to look closely at five variables: frequency of the planning, granularity of the planning (such as monthly, weekly, or daily planning), the construct of the data model (what is modeled), the input into the data model (shipments, orders, channel data), and the drivers of demand-

forecasting variance (promotions, seasonal builds). To get it right, the data must be scrubbed and normalized to ensure an apples-to-apples comparison. As a result, companies should never accept data from self-reported sources (such as APICS, IBF, APQC, SCOR Council, and most industry surveys).

Reason No. 2: The Apple Doesn't Fall Far From the Tree

To be useful, and since market conditions change, the data set needs to represent a similar peer group from the same point in time. Since many companies have multiple supply chains, and competitors tend to not want to share data directly with their competitors, getting the data is quite a feat.

Prologue

I recently ran into Robert Byrne, CEO of Terra Technology, and was excited to find that he had just finished a project to benchmark demand data for the consumer products (CP) companies he had worked with in deploying his software solution. Five of the companies were organizations that I had benchmarked in 2003 and worked with over the past five years. While neither Rob nor I can share the names of the companies, I would like to share my insights on their journeys. It's truly a story of trading places.

The Story

While it may not be as much fun as the original movie, this is a real story where a focus on supply chain basics made a difference. Figure 2 shows the relative positions of the companies in the two analyses.

Figure 2. Comparison of Five CP Companies' Forecast Accuracy

Comparison of Five Consumer Products Companies' Forecast Accuracy
(Monthly Forecasting at an Item/Ship From Level - 30 Day Lag)

Company Designation	Relative Ranking of Forecast Accuracy (2003)	Relative Ranking of Forecast Accuracy (2011)	Technology Used	Organizational Structure: Global versus Regional
A	1	5	SAP APO	Matrix organization with a change in reporting through go-to-market teams
B	2	2	SAP APO	Centralized with a strong focus on analysis
C	3	4	JDA/ Manugistics	Strong regional focus
D	4	1	JDA/ Manugistics	Matrix organization with global reporting through supply chain
E	5	3	SAP APO	Centralized with strong IT/line of business partnering

Has the Industry Made Progress?

Some, but not a great leap forward. For the group of companies that Terra Technology benchmarked, the average monthly mean absolute percentage error (MAPE) for a one-month lag was 31% + 12%. Data eight years ago for the same companies was an average of 36% + 10% MAPE.

The result? This group of CP leaders has gotten slightly, but not significantly, better in demand forecasting. They've weathered the storm of market changes that could have made the forecast far worse. While few people in their organizations are giving these leaders pats on the backs (demand planners are used to getting kicked), I expected the results to be much worse. The industry has experienced major shocks, including shorter product lifecycles, product proliferation, higher levels of promotions, changes in competitive behavior, and global expansion.

What made the difference? Three elements drove the difference in relative position: organizational reporting, process discipline, and the use of data-driven processes.

What didn't make a difference? The type of software used for tactical forecasting. It's the use of the software, rather than the selection of the software, that made the real difference.

Organizational Reporting

The company that had the worst performance in Rob's benchmarking, but the best performance in 2003, introduced a very high forecast bias due to a change in forecast reporting relationships. The company made a decision shortly after the benchmarking in 2003 to have the forecasting group report through sales, where there was a pervasive belief in the organization that, if the company overforecasted, sales would be higher. This decision increased bias and cast a cloud over the process. The lack of a "true north" in the organization became a stumbling block to improving forecast accuracy.

Better Math

In the Terra Technology study, the use of statistical modeling software improved the forecast 3% on average (on a MAPE level with a one-month lag) when compared to a naïve forecast (volume planning where the forecast is based on what was shipped last month). When the leaders used the math, it made a difference. In the top quartile of customers, the impact was two times or a 6% improvement in MAPE.

What's a 6% improvement in forecast accuracy worth? Based on AMR Research correlations, a 6% forecast improvement could improve the perfect order by 10% and deliver a 10% to 15% reduction in inventory. The greatest impact is seen in slow-moving items on the tail of the supply chain. Unfortunately, most companies let their supply chain tail whip them around.

Basics Matter

For me, the interesting story underneath the data is the switch in position of the players over the course of eight years. In this time period, the best-in-class company in 2003 became the worst performer, and two low performers propelled themselves forward. These companies focused hard on the basics. This included efforts to clean data, identify an accurate baseline forecast, frequently tune supply chain planning software, establish a strong corporate demand-planning team that reported through supply chain, and use statistics.

Thoughts on Tactical Forecasting

While technology vendors like to brag about the use of their technology making a difference in supply chain leadership, the data here is inconclusive. Instead, what made a difference was process, data, and organizational reporting. I know, not the sexy stuff — but when it comes to tactical forecasting, the basics matter. And while many companies think they can overcome the deficiencies of bad forecasting through shorter cycle times, this is shortsighted. The biggest advantages for the great forecasters are in improving tactical decision making (long-range planning, usually from three to eighteen months) to invest in the right manufacturing asset strategies, sourcing and commodity hedging plans, and long-range planning with carriers. Companies that don't do this well are pushed to always react and are forced to always be on their "back feet," with a serious impact to costs, customer service, and inventory turns.

The data also supports that tactical forecasting, by itself, is not sufficient. The design of conventional supply chain software, where the tactical forecast is consumed through rules-based consumption, is deficient. The work by Terra Technology to develop demand-sensing capabilities improves the forecast by 15% to 33% (based on client interviews) and supply chain decision making in the operational horizon (weeks in the forecast duration of three to twelve weeks). This is a difference that matters for deployment, inventory, and manufacturing planning.

Revenue Management: Beyond Smoke and Mirrors

Improving revenue management, which includes the management of a multiparty trade settlement (sometimes dubbed "bifurcated trade management"), is an equal opportunity for all supply chains. Whether you're in a consumer, high-tech, life sciences, or chemical supply chain, it's a major source of cost, waste, and frustration. Executives will often ask, "Why can't we get this right?"

I empathize. What seems so simple is very complex.

The revenue management process varies by industry. Each value network shapes demand a bit differently, and the contract terms are very industry-specific. For example, consumer products (CP) companies lean heavily on trade promotions, high-tech supply chains focus on new product introductions, life sciences on rebates and value-based outcomes, and the chemical industry on price.

Despite the differences, there are still commonalities.

Traditional Customer Relationship Management (CRM) Is Not the Answer

The historic footprint of CRM is sales pipeline management, customer service and call center execution, and business development. This footprint lacks the data model for decision support (revenue management optimization [RMO]) or execution (revenue management execution [RME]). This CRM data model is fundamentally flawed, since it's focused on a pipeline data model for sales effectiveness versus a product/services data model that looks at the process workflows of bifurcated trade, the inter-relationships of the demand-shaping levers (price, promotion, incentives, buzz from the social web, trade and brand marketing, and new product launch), and the visibility of a clear baseline forecast. As a result, the industry is forced to nurture and evolve small, industry-specific providers to augment and redefine front-office functionality.

Complex Workflows With Substantial Opportunity

For the corporate fiscal year ending in 2010, the size of the prize was large. The average CP company spent 22% of revenue on trade promotion management (source: Symphony/IRI and AMR Research/Gartner), and for the average life sciences company, rebates represented 18% of revenue (source: IMS). For either industry segment, this can quickly add up to over a billion dollars annually. Yet no company that I've interviewed in either industry (and that's over 150 companies) believes that their processes are under control. Uniformly, companies see revenue management as an opportunity, but don't know how to seize it. There is no easy answer. To understand why, read on.

Industry-Specific Workflows

Each industry shapes demand differently, has different contracting processes with their downstream trading partners (buy-side), and uses substantially different language/terminology to describe what they do. (Can you imagine if you substituted the acronym BOGO [buy one get one free] from the consumer packaged goods [CPG] sales cycle for averaged managed price [AMP] from the life sciences sales cycle? These processes are very industry-specific.)

This leads to a problem. When buying a solution, where do companies turn? Who can they trust? There's no perfect solution. Why? Traditional CRM technologies are insufficient to solve the problem. In sales cycles, the battle lines quickly form. IT departments want "one throat to choke," believing that this type of functionality can be sourced from either a CRM or ERP provider. Lines-of-business leaders believe that they need industry-specific functionality from industry-specific suppliers.

They're both right. They're just not good at drawing the battle lines.

Companies need traditional CRM functionality for business development and contact management, but industry-specific functionality for predictive analytics, baseline forecasting, and bifurcated trade management. The decision on business intelligence needs to be based on the total IT portfolio.

Changing Processes

These aren't enterprise, but inter-enterprise, workflows driven largely by the nature of the relationships in the extended value chain. As a result, they need to be designed from the outside-in, not the inside-out. However, the technologies lack an inter-enterprise system of record and standards. Given the recent shifts in power and the increasing compliance/regulations of these industries, the industry processes are in flux, and the need is greater, with even more dollars on the table.

Opportunity Abounds in Both Planning and Execution

While revenue management should be a horizontal process focused on demand orchestration, the applications in the market are largely piecemeal, serving organizational silos and not end-to-end supply chain processes. There are no complete solutions. The choice is fraught with risk, but I've seen greater success when companies chose industry-specific, best-of-breed providers than try to adapt the data model through the custom development that's required with an ERP solution. In short, although people want it, there's no effective end-to-end solution for any industry for revenue management.

Split the Baby?

It would be great if there was an industry roll-up strategy to consolidate the small vendors that abound in the area of revenue management to deliver an end-to-end solution. The list of names is long: Accenture/CAS Systems, Adesso, BizTech, DemandTec, MEI, Model N, ProMax, Oracle, Symphony/IRI, SAS, Synectics, Vendavo, and Zilliant.

I fear that the end-to-end solution is a long way off. Change is slow. Until then, users will have to "split the baby" by layering industry-specific revenue management software over industry-agnostic CRM.

However, there were recently a series of announcements that I feel are deserving of a mention. The industry is changing.

Model N With Its Feet on the Ground and Its Head in the Cloud

As I sat in the packed audience at the Model N user conference Rainmaker, I could feel the energy. As a company, Model N is now nine years old, with three-hundred and fifty employees and a

global presence. It primarily serves two industries: life sciences and high tech. The company has moved to an agile release schedule, allowing it to move quickly against the changing requirements of both industries.

Last year, Model N successfully released five major and two minor releases. The good news for me was the successful launch of its cloud service. Buyer preference in revenue management is clearly moving to software as a service (SaaS), and Model N can now answer this challenge.

Model N is clearly a company that is beyond "smoke and mirrors." It has a strong product heritage, and the company prides itself in serving its customers. I've wondered, on many occasions, how much more successful Model N could be if it improved its sales and marketing. The company lacks name recognition and hasn't differentiated itself in the market, although the solution is clearly differentiated and reliable. When the smoke clears, I feel that Model N will still be a player.

M-Factor Acquired by DemandTec

DemandTec recently announced the acquisition of M-Factor. The M-Factor product was a unique, niche solution that was launched before its time. It enabled the optimization of all marketing spend in CP — advertising with a multiyear lift and trade promotion spending with a single period lift — to determine the right mix of demand-shaping activities. M-Factor's visionary founder died tragically seven months ago, and although the company had raised venture funds in tough market conditions, like many small enterprise software companies, scaling growth is expensive and takes time, compared to the consumer plays that Silicon Valley currently favors. Considering the depth of the optimization solution — one of the strongest technologies in the market to determine baseline forecasting — and a good number of Tier 1 customers, the purchase price was a good deal for DemandTec.

Although the DemandTec press releases on the acquisition were bullish, and the companies share a common heritage, the merging of these two SaaS offerings doesn't yield a complete solution for CP. The DemandTec solution, though a strong offering for trade promotion management for the sales account teams, still lacks the core functionality for headquarters trade promotion management. However, it's a nice complement to an ERP solution such as Oracle. The press releases were a bit too "smoke and mirrors" for this old analyst gal.

ProMax: A New Contender

A new contender in CP trade promotions from "down under" entered the North American and European markets in 2010. ProMax recently announced selection by Kimberly-Clark. The company is attacking the CAS user base. With successful implementations at Beiersdorf, Dial, and Henkel, the team is inching forward, touting a simpler, easier, best-of-breed solution. I will keep my eyes on its references to see if it delivers. This is a case of where there is smoke, there may be fire. It's too early to tell, but it looks promising.

There we have it — three announcements in a confused market full of smoke and mirrors. While we're inching down the path, we're still a long way from a perfect end-to-end process solution for revenue management.

Bait and Switch

Bait and switch: A form of fraud. A dishonest marketing tactic where a marketer advertises a very attractive value proposition, and then switches the offer to something else after gaining interest by the buyer. — Merriam-Webster Dictionary

The acronyms keep coming — DDSN, DDSC, DDVN, CDSN — and the cadence doesn't stop. Everyone seems to have a new one. Today, they swirl in the market, forming a fog. The term "demand driven" has become vogue again, but what does it really mean? And should it be taken one step further to orchestrate bidirectionally, market to market, in market-driven value networks? Or will companies stumble on the path by mistakenly implementing supply-centric processes and calling them demand-driven initiatives?

There are a number of newly anointed "experts" writing articles about becoming demand-driven. Right now, they're piling up on my desk. As a writer of research on demand-driven supply chains for over eight years, I find many amusing. I like the idea that this old concept is gaining new steam, but unfortunately, too few people who are writing the articles really understand the concepts. Instead, I see a behavior that I call "bait and switch": the article is written and the story is spun, but the solution offered is a supply-centric product based on yesterday's technology. The original principles of a value network that can sense, shape, and translate demand with near-zero latency are being lost in the fog.

Why is this happening? The market for large ERP programs is slowing. The "gravy train" is coming to an end. User satisfaction with planning systems is low. The market shift is toward analytics, but this new market is confusing.

Supply chain leaders feel stuck. Their current technologies are inadequate, and they struggle to manage the challenges of simultaneously driving growth, improving profitability, absorbing complexity, and reducing cycles. Frustration is mounting. The concepts surrounding demand driven sound right, and companies are interested. As a result, articles are written proclaiming demand-driven results, but then the reader is given a solution that's anything but demand driven.

Each time these articles are published, the Shaman sighs and chuckles in her little apartment in Baltimore.

The first definition of demand-driven supply chains was pushed into the market by AMR Research (now part of the Gartner Group) in 2004. What the articles now flooding the market don't tell you about is this:

- **Slow adoption** — Eight years after the evolution of the concept, there are only a few companies making progress on demand-driven concepts. If asked, I would only cast a vote for the demand-driven work that is happening at Cisco Systems, General Mills, Pfizer, PepsiCo, P&G, and Kimberly-Clark. Each of these pioneers would tell you that it's hard work. No one company — technology provider or supply chain line-of-business leader — has figured it out. Most have implemented the concepts in parts of their businesses. The most successful have used best-of-breed solutions.

- **Hard work** — Many companies that have started demand-driven initiatives have abandoned them. The rewards are high, but the cultural barriers are difficult. In some cases, they're insurmountable.

- **Misunderstood** — A frequent reason for failure is a lack of understanding of the basic concepts of demand latency, sensing, shaping, and translation. As a result, many well-intentioned companies have mislabeled supply-centric initiatives as demand driven.

- **Demand-driven concepts aren't an evolution** — They are step changes requiring either the redeployment of existing technologies or the purchase of new platforms. Details matter. Data model structures are the difference between success and failure. Today's architectures are designed from the inside-out, not the outside-in. To be demand driven, the process focus needs to change. This often means a reimplementation of an APS and a change in focus for the company.

- **Be careful of the word "integrated"** — The promise of an "integrated supply chain" sounds attractive, but tight integration has reduced agility and made its response less flexible. Today, due to tight integration, only 10% of companies are satisfied with their what-if modeling capabilities, and only 23% can model supply chain profitability. Both are essential. The goal should be to synchronize demand and supply with role-based dashboards, workbenches, and optimization engines that allow users to work across the supply chain. To accomplish this, demand has to be sensed, shaped, and translated.

- **Change management issues are high** — The largest challenges are in the redefinition of process flows from inside-out to outside-in. Demand-driven concepts are expansive, extending from the customer's customer to the supplier's supplier, but the areas of sales and pro-

curement are often very resistant to demand-driven concepts. To do this, companies need an end-to-end leader. Only 1% of companies have defined this role.

- **Most have defined "demand" too narrowly** — Demand in the demand-driven network is about much, much more than forecasting.
- **It needs to be about more than demand** — Supply is volatile. Shortages abound. It's for this reason that I've defined market-driven value network processes in my book *Bricks Matter*. Here's the definition: "an adaptive network focused on value-based outcomes that sense and translate market changes (buy- and sell-side markets) bidirectionally, with near-real-time data latency, to align sell, deliver, make, and source operations."

As we move forward, there are no silver bullets or well-defined industry platforms. I coach companies to take the following steps:

- **List all the forms of demand data and map their usage** — This includes unstructured text data (for example, from social networks, ratings and reviews from blogs and websites, and channel data), weather data, and transactional data. Some supply chains also have inputs from the evolving world of the Internet of Things, where machine sensors transmit frequent streams of data. This is the case for heavy equipment, vending machines in the field, and smart shelves.
- **Map the process outside-in, from the channel back** — Start with the channel and map its requirements. Evaluate how to reduce latency by using downstream data to sense demand and implementing demand translation technologies to make this data usable. Technologies include the offerings from Terra Technology and Toolsgroup. (While SAP has purchased SmartOps and is marketing a demand-sensing/demand translation offering, I haven't been able to validate the solution through references. It's clear that math matters. Neither Oracle nor JDA Software references were able to meet the challenges in the field.)
- **Build what-if analytics** — Technologies such as ones from Kinaxis and Steelwedge are frequently undervalued for supply chain visualization and what-if analytics. Cloud-based analytics for sourcing and the management of supplier networks are evolving, and should be embraced. Consider solutions from GHX, Elemica, E2open, and SCA Technologies to improve end-to-end visibility.
- **Design the network** — Actively design the network with clear push/pull boundaries and right-size buffers. The strongest solutions in the market continue to be LLamasoft, Insights, and JDA Software, and the strongest consulting partner for network design is Chainalytics. I

also like the work that's happening at the Demand-Driven Institute on the redesign of manufacturing to be more demand driven.

- **Focus on end-to-end orchestration** — Build processes that enable the alignment between demand- and market-shaping levers to orchestrate end to end, bidirectionally, through outside-in, horizontal processes (see Figure 3). Actively orchestrate demand through shaping and the supply response through market-driven levers. Charter the end-to-end process manager to orchestrate a market-driven value network that connects and orchestrates bidirectionally between markets.

Figure 3. Demand-Shaping and Market-Driven Orchestration Levers

Demand-Shaping Levers
New Product Launch
Marketing
Sales Incentives
Trade Promotions
Distributor Incentives
Assortment
Price
Run-Out of Obsolescence or Mark-Down Strategies

Market-Driven Orchestration Levers
Price-to-Price Orchestration
Alternate Bill of Materials
Alternate Sourcing
Change in Assortment
Orchestration of Product Mix (incent products with less commodity variability)
Changes in Demand Shaping Strategies
Commodity Hedging

- **Use new forms of data that embrace digital** — Think long term on the use of digital signals. Map the use of mobile/social and e-commerce on the future of the digital path to purchase, and the impact of machine-to-machine interfaces in manufacturing on digital manufacturing. It excites me to see the revitalization of manufacturing applications being more demand driven based on the Internet of Things in process industries and 3D printing in the discrete industries.
- **Experiment with best-of-breed technologies** — This innovation isn't going to come from the large players. It'll require large manufacturers to take risks with smaller players, such as Applied Predictive Technologies, Enterra Solutions, Orchestro, Retail Solutions, and SignalDemand.
- **There's no substitute for leadership** — Success happens when there's an inspired leader that believes that the supply chain group needs to own the supply chain from the consumer/user to the supplier's supplier.
- **Focus on building horizontal processes** — These bridge the gaps between functions. The four main horizontal processes to tackle are revenue management, sales and operations planning, supplier development, and corporate social responsibility.

Goodbye to a Global Pioneer

As I attended the IBF Forecasting Conference in Shanghai, I learned about the death of Dick Clark. Dick, the demand-planning global process owner at P&G, was always one of my favorite interviews for my reports. Not only was he smart and insightful, but he was also a fighter, especially for demand-planning excellence. But after many years of a heroic fight against cancer, Dick slipped away. He leaves a network of trained global planners within the P&G system that will carry on his legacy.

Remembering a Legacy

Five years ago, Dick and I spoke about China and the barriers to building a team of planners in the explosive economy. At that time, I had just returned from Shanghai, and was disappointed to not find more planning talent at the supply chain events. Dick had just finished training all of the P&G regions on forecasting, spending months on the road with his in-country teams.

We shared notes and talked about what makes good global planning, and how to best use regional observations. It was one of my favorite discussions with Dick, and it was especially poignant as I watched a group of sixty planners register for the IBF Forecasting Certification/Conference. (I couldn't find a planner at this conference five years ago.)

Coming back from China, I wanted to talk to Dick about my observations. I wanted to share that I was very impressed with the quality, focus, and intent of the planners that came to the IBF Forecasting Conference this year. I felt that I witnessed a focus on planning that wasn't possible five years ago. I wanted to thank him for his service to improve the practice of forecasting. Unfortunately, this wasn't possible. Instead, I hung my head and spent an hour walking outside, thinking about what I learned from Dick Clark.

What I Learned From Dick

Dick was very giving and always prepared for my interviews. He never turned down an opportunity. Here are some of my key takeaways from our many discussions:

- **A good forecast is used.** While other practitioners spoke of numbers, models, and technologies, Dick took a much more pragmatic approach. In his opinion, the best forecasts are used.

He was working to improve consistency in the data, reliability in reporting, and simplicity in data representation.

- **Organizational change is slow.** Be patient. He had been at this for over twenty years. We spoke of bias and error, and the need for organizational alignment. His caution was that success comes in inches, not miles. He believed that, with the consolidation of major manufacturers, the evolution of great demand-planning practices required a slow and consistent focus. One of the most important attributes for his team, he said, was patience.

- **Forecasting teams must be trained.** Dick was a stickler for training. He explained that what I thought was obvious was not so obvious, especially in emerging economies. He believed that the teams should be trained in region, and that it was his role to slowly build the skills. He dedicated his life to this legacy.

- **Look for new ways to do things.** Dick was one of the earliest adopters of advanced planning systems (APS), and he was always scouting for new technologies. He had the courage to push the adoption of what was then a little-known technology provider, Terra Technology, and he was confident to invest in co-development with the company. He understood that it was harder to do co-development with large technology providers, and was willing to take risks.

- **Give back to the practice.** In the years that he fought cancer with radiation and chemotherapy, I frequently ran into Dick on the speaker circuit. While many would have withdrawn to heal, Dick continued to give. I watched him give a speech last December with a disfigured face and slurred speech from radiation. At the break, I asked about his treatment and if he was okay to travel. He told me that he wasn't ready to die. He fought, he gave, and he believed.

Supply chain management practices are maturing in China. Most of the planners that came to the IBF event were from major corporations that had been mentored by the Dick Clarks of their organizations. Thank you, Dick, and all of the other early pioneers that paved the way for global supply chains, for all that you did.

May you rest in peace. I will miss you.

Demand Cacophony

It was to be a unified signal — spanning from the customer's customer to supplier's supplier — to join, align, and guide the supply chain response. For most, it has failed.

The promise was harmony, but the delivery was dissonance.

Let me start with some perspective. I've followed the evolution of supply chain practices for thirty years.

As a business practitioner, I built demand-planning systems on spreadsheets to help plan inventory.

As a technologist, I implemented demand management systems for a major supply chain planning company. I rode the hype of the supply chain planning technology cycle with vigor and projected high hopes.

As an analyst, I've followed the evolution of demand-planning processes. I've written about what they are, where they're at, and what they could be. This is my point of view: we've let demand-planning systems evolve, but as the technologies changed, we didn't rethink the processes to take advantage of new demand signals, better sensing in global markets, or actively shaping demand based on what customers want to buy. We haven't challenged the vendors. I feel that there's a need to architect these processes to seize new opportunities and to deliver on the original promise. The synonyms for cacophony are "jarring," "grating," "uproar," and "clamor." These words aptly describe the environments of most of my demand-planning clients. Here are the disconnections that I see driving the dissonance.

What's Demand?

Companies believe they purchased and implemented processes to project demand, and they did. However, the goal line has changed, and most haven't accepted this reality. Their internal definition of demand has migrated, but their systems and processes have not. What does this mean? The systems that were implemented in the go-go days of supply chain planning forecast what manufacturing should make using order history. It's not what the market wants to buy using market

signals. In fact, it's far from it. The demand signals in most organizations are "supply driven," not "market driven," and most companies don't realize the difference.

How Can Demand-Planning Systems Grow Up?

The number of potential signals has proliferated. They have less latency. They better reflect true demand. In my work, no one argues that use of social signals, sentiment analysis, distributor data, or point-of-sale (POS) data can improve the timeliness and accuracy of the forecast. The issue is how to use it. In traditional architectures, there's nowhere to put it. The models weren't designed to use it. Instead of being able to embrace these new and varied signals, they're forming a cacophony surrounding traditional demand forecast processes. People ask the question, "How do I use these new forms of demand data?" However, when they hear the answer — rethink your demand-planning architectures — they're unwilling to take the next step. This redefinition is still early.

Are We Shaping or Shifting Demand?

The cacophony is propelled by a corporate reward system. Let me explain. Sales is incented on growth. Supply chain teams are rewarded for costs. Demand processes struggle to get ownership across marketing and sales because many teams don't want the discipline or the transparency of a market-driven approach. As a result, many companies shift demand instead of shaping it.

What's the difference? Shifting demand is the use of demand-shaping levers (changing price, promotional tactics, or new product launch strategies) to move demand from one period to another. Why? Usually, there's an organizational struggle. Although it may help a sales executive get a bonus, it increases waste in the value chain and is a barrier for building strong collaborative relationships.

On the other hand, shaping demand — using the demand-shaping levers of price, promotion, new product launch, and sales incentives — to increase baseline lift, grow market share, and build new markets requires discipline, teamwork, and market knowledge. Most sales and marketing organizations aren't ready to be market driven, focused instead on inside-out metrics, not outside-in processes. Typically, the focus is on meeting internal metrics versus maximizing market potential.

Now, before I continue, I want to be sure that we're clear on terms. I believe that supply chains need to be market driven. In my research, I see that the strongest supply chains are connected by horizontal processes from sell-side to buy-side, and bidirectionally define go-to-market strategies. I was a visionary in the writing of demand-driven supply chains, but I believe that the demand-driven definition isn't sufficient. Why? The definition of "demand driven" is to sense, shape, and drive a demand response with near-real-time latency of data. While I believe that sensing, shaping, and architecting the demand response are critical, I don't think they're sufficient. This definition is missing the bidirectional trade-offs between buy- and sell-side market strategies to balance risk and opportunity. Supply chains are becoming more constrained by supply-side decisions: for retailers, goods are forecast to increase in price by 20% this year, due to transportation constraints; demand has outstripped supply in agribusinesses for the past four years; and raw material prices are a boardroom issue. As a result, the connection of demand signals horizontally to drive market-driven processes is growing in importance. There are no market-driven supply chain solutions at this point in time in the market.

Five Steps to Take

Accept
Recognize that conventional demand-planning systems are nearing the end of their lives. Accept it. Respect them for what they are, and maximize their use. Don't try to use them for something they weren't designed to do. Accept that you will be living in a demand cacophony for many years. Learn how to tune into different channels and manually connect the dots. Alternatively, redeploy demand planning to be a demand-side application, and translate what you're going to sell into what you're going to make.

Get Good at Sensing
New systems for demand management will evolve over time. However, to get ready to use them, get better at using demand signals and get good at demand sensing. Evaluate new technologies, and realize that this new data doesn't fit into conventional demand-planning processes. We aren't ready for direct integration. The traditional forecasting systems lack the data model, scale, and scope to accommodate these signals. Today, you can only use them to simulate test and learn environments.

Be a Realist

Recognize that there is no planning architecture that allows you to use social data, sentiment analysis, downstream data, distributor data, and sales account team input well. Follow the evolution of technologies in this area, and invest in early pilots, knowing that the answer isn't going to be quick.

Build Your Core

Build strong horizontal processes — revenue management, sales and operations planning (S&OP), supplier development, innovation, and new product launch — to support supply chain strategies. Build demand management discipline into these processes. (For example, in your revenue management processes, did you shift or shape demand? What was the bias and error from management input in the S&OP process? How effectively did you forecast new product launch?)

Develop a Market-Driven Strategy

Prepare by asking yourself three questions: what is the role of the demand signal in connecting sales-side strategies to buy-side strategies to mitigate risk and maximize opportunity? Why is this important for my business? What is our roadmap to get there?

The Seven Sins of Demand Planning

The Institute for Business Forecasting celebrated its 30th anniversary in Dallas, Texas, without even a party. I think that we owe the organization a debt of thanks for continuing its advancement of demand-planning excellence. In my opinion, the greatest sin of all is that we have spent thirty years developing forecasting processes that are largely not used or trusted by the organizations that they serve.

The Seven Sins

At the IBF event, I facilitated a breakout session to discuss demand-planning issues. The top-of-mind topics for the group discussion included these seven deadly sins:

Sin No. 1: Not Using the Statistical Forecast to Drive Continuous Improvement

I've never worked with a company that couldn't improve its forecasting through better use of statistics. However, most companies are skeptical. They are "experts" who believe that they know the business better than any statistical package ever could. Given that a forecast is always wrong, and the forecasting process is fraught with political issues, companies struggle with how to use and gain acceptance for statistical forecasting.

While benchmarking the forecast is difficult, measuring continuous improvement through forecast value added (FVA) analysis is a helpful and easier method to drive continuous improvement. In most FVA analysis presentations that I've seen lately, the statistical forecast is improving the "naïve" forecast — that is, the forecast made based on the prior month's order history — by 3% to 5%. Similarly, the lack of control of managerial discipline in the consensus forecasting process is reducing forecast accuracy by 2% to 5%. The technique allows companies to measure, improve, and better drive forecast accuracy, as well as to gain business alignment and support for the effort by monetizing the impact of the forecast error. For example, one of the speakers at the conference shared that a 2% improvement in forecast accuracy was equal to two employees' salaries in his business. If the forecast could be improved by 2%, he could reduce the time spent on order expediting.

Bottom line: Don't look at forecast accuracy in isolation.

Sin No. 2: Only Owning Part of the Forecast

To use a baseball analogy, most demand-planning teams are in the outfield. They catch the forecast from sales and marketing without owning the entire process. They throw the forecast across functions without value-added analysis.

Best-in-class teams, however, own the entire forecast. They know the baseline forecast and work on driving root-cause analysis to improve demand-shaping programs, such as price, promotions, marketing events, new product launch, and sales incentives. What does the difference look like? For one company that I worked with over the past two years, this change was worth $5 million in the reduction of obsolescence.

Bottom line: Move out of the outfield and hit a home run.

Sin No. 3: Misuse of Downstream Data as an Input

When running out a product, be careful in the use of downstream data to prevent obsolescence. Realize that you are pushing into the channel and don't want to drive replenishment. If you don't have this discipline, you'll recreate the Green Volvo Story. Remember that one? Hau Lee tells the story: "Volvo was awash in chartreuse green cars, despite trying every option at the distributor to push the cars. So, the company decided to price them at a significant price reduction to move them and reduce inventory. However, this strategy was not communicated across the organization to the demand-planning group. As a result, when the green Volvos sold, the sales orders triggered a forecast. The forecast consumption logic triggered replenishment, and the factory cranked up the production lines to make green Volvos."

I was telling this story a couple of years ago to a company that made women's intimate apparel, and the group started laughing incessantly. I finally stopped and asked about their outbursts. In between uncontrollable laughter, they shared that their green Volvos were leopard skin fur thongs. So, this sin goes across all industries, from cars to lingerie.

When pushing slow and obsolete inventory, or SLOB, turn off the use of downstream data, and be careful to not let orders drive replenishment. Likewise, downstream data should be used to trigger the completion of promotional replenishment. Sensing when to end a promotion is also essential for eliminating SLOB.

Bottom line: Design the forecasting process, and the use of the output of the forecasting process, from the outside-in. In driving accurate replenishment, there is no substitute for knowing true channel behavior.

Sin No. 4: A Project, Not a Program
A frequent question that I'm asked is, "How can I implement demand planning faster?" I'll answer the question, but then I'll ask, "Aren't you shooting for the wrong goal? Shouldn't your goal be to implement demand planning well, not fast?"

One of the companies that I admire, proving year over year to be one of the great leaders in the use of SAP APO DP, is General Mills. When I wrote a case study of General Mills' implementation as an AMR Research analyst, many companies pushed back, asking why I showcased the company. The reason was simple. It didn't implement demand planning the fastest — it did it the best. For General Mills, it was a program, and it was valued. The company wanted to get it right, so it was not treated as a project to quickly implement.

Bottom line: Take your time and get demand planning right.

Sin No. 5: Not All Items Are Created Equally
In the words of one participant in the workshop, "Get to know the DNA of your item." A few years ago, I was working with a company that made baby formula. Its most important — and the lowest volume — items were samples that were distributed at hospitals' maternity wards to new mothers as a method to promote the product trial. A successful trial could drive a couple years' consumption during the child's years growing from a baby to a toddler. So, a forecast error on these products was worth substantially more than a forecast error on turn volume.

Bottom line: An item is not an item. The criticality of the item is not based on volume. Instead, it's defined by market drivers. To avoid being on the hot seat, understand the relative importance of items, and be sure that their forecasting methods are treated with special care.

Sin No. 6: Forecast With the End in Mind
This may sound simple, but it's still a sin that's frequently made. While many companies have set up their forecasting systems to predict what manufacturing needs to make and when, the greater opportunity is to model what the channel is going to sell and when. The company then translates

these demand requirements to internal and external manufacturing locations. It's not as easy as just modeling the selling unit at the retail chain level. This is usually too low of a level to forecast — insufficient data to be significantly relevant — for the forecasting process. Likewise, with this increased need for transportation forecasting visibility, there's a need to forecast transportation requirements and to use channel data to determine distribution requirements. It's a proven fact that forecast consumption logic and one-number forecasting isn't sufficient. Instead, multiple forecasts need to be translated into a demand visibility signal for the corporation.

Bottom line: Design the process with the end in mind, given the analysis of data patterns.

Sin No. 7: Arrogance, or Not Serving the Organization
At the conference, the SVP of Radio Shack gave a presentation on what makes a great demand-planning group. His words of wisdom were "be humble" and "serve the organization." In his experience, when the demand-planning groups become arrogant — a "know-it-all group" that polices the forecast — everyone loses.

Bottom line: The best organizations serve the greater organization.

Section 5:
Technology

Supply Chain Leaders Must Demand More Value to Avoid Another Concorde

In high school, my favorite teacher was Wanda Hughes, who taught history. Her class was both loved and feared — there was no messing around. It was strictly business. She made us read *The Wall Street Journal* and *The New York Times* daily. We debated the potential outcome of headlines: the Vietnam War, the rise of the Beatles, and the fall of the Nixon administration. We learned that current events quickly become history. In the process, I learned that there were patterns: people make the same mistakes over and over again because it's hard to learn from history.

A Look Back

When I was 28, I worked for General Foods (now a division of Kraft). I was a divisional engineer responsible for the purchase of $42 million of equipment for a national launch. It was a big responsibility for a young kid.

The equipment vendor was in Denmark, and I flew cross-Atlantic flights frequently to check on progress. In those days, the corporate policy was to book cross-Atlantic travel as a first-class ticket. (Ah, yes. Sadly, these days are gone forever.) I had the enviable choice to either fly SAS First Class directly to Copenhagen, or book to Paris on the Concorde and make the connection to Denmark. The total time difference was two hours. The cost for the Concorde aircraft was slightly higher than a first-class seat on SAS. For me, the choice was easy. The Concorde was not as pleasant of a ride. The seats were smaller, and the food was not as good.

Today, there are no Concorde flights. It was canceled in 2003. After twenty-seven years of flight, it died a slow death. The price/value equation for the average traveler flying on the Concorde just wasn't there.

Learning From History

Every year, computer speeds get faster and memory costs get lower. I'm currently working with several supply chain technology vendors that are attempting to place these new forms of analytics underneath traditional supply chain planning platforms.

But this is analogous to the story of the Concorde. My question is this: should we invest to make current supply chain planning systems faster, or take advantage of new technologies to redefine them?

I was recently speaking to a leader at a supply chain planning company, and his words hang in my mind: "Lora, you're pulling us along. It's hard for us to do things differently. Our business users ask us for refinements, not a rewrite of supply chain planning. The momentum in the company isn't to do things differently. There's no incentive to adopt new enabling technologies."
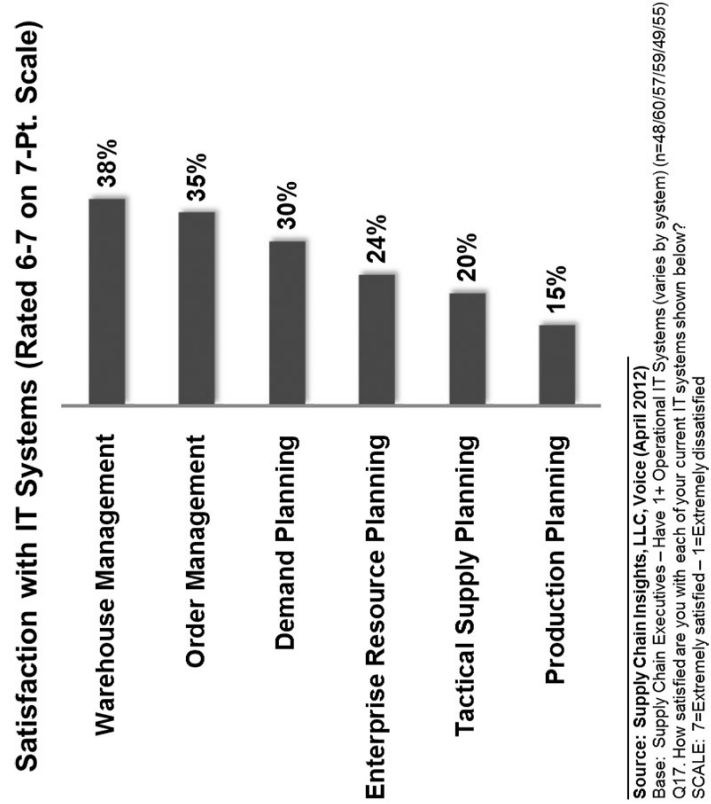
In my opinion, there's not enough value in speeding up traditional supply chain planning footprints to make it worth our time. I want technology vendors to start over, "paint outside the lines," and recreate supply chain planning. I want them to deliver more value for the supply chain leader.

However, I'm convinced that this will only happen if it's pushed by supply chain leaders. If they don't push, I fear that we'll have the 1995 version of supply chain planning in-memory. Eventually, this would become another Concorde.

The Definition of Supply Chain Planning Is Inadequate

Supply chain planning applications rate lower in user satisfaction than supply chain execution (warehouse and transportation management) software systems. In Figure 1, based on a recent supply chain survey of sixty supply chain leaders, you can see the current satisfaction levels of supply chain software.

Figure 1. User Satisfaction With Current Supply Chain Software

Satisfaction with IT Systems (Rated 6-7 on 7-Pt. Scale)

- Warehouse Management — 38%
- Order Management — 35%
- Demand Planning — 30%
- Enterprise Resource Planning — 24%
- Tactical Supply Planning — 20%
- Production Planning — 15%

Source: Supply Chain Insights, LLC, Voice (April 2012)
Base: Supply Chain Executives – Have 1+ Operational IT Systems (varies by system) (n=48/60/57/59/49/55)
Q17. How satisfied are you with each of your current IT systems shown below?
SCALE: 7=Extremely satisfied – 1=Extremely dissatisfied

The traditional definitions of planning were based on computer capabilities from the 1990s. They were the best that we could do then, but they're inadequate today. There hasn't been a substantial redefinition of planning platforms since 1995.

Time to Paint Outside the Traditional Lines

I would love to see these new forms of analytics put to use in building the end-to-end value network. I would like for us to redefine, instead of making the old, inadequate definitions faster. I'm passionate about using new technologies to redefine business outcomes.

The possibilities to improve supply chain planning are numerous — deeper optimization, in-memory processing, mobility, pattern recognition, rules-based ontologies, simulation, text mining, and visualization — and offer great promise. However, the adoption of these new technologies to supply chain planning platforms has been slow. I find that most line-of-business users don't even know about some of the possibilities.

Figure 2. Potential Supply Chain Planning Platform Using New Technologies

Sell		Deliver	Make	Source	Service
Strategic Network Design					
Revenue Management		Sales & Operations Planning		Supplier Development	
Demand Translation and Demand Orchestration					
Contract Management / Price and Promotion Management	Demand Planning	Distribution Requirements Planning	Tactical Supply Planning	Procurement Contract Management / Material Requirements Planning	Contract Management and Warranty Planning / Service Parts and Labor Planning
Market Execution	Demand Execution and Forecast Value Added Analysis	Deployment Planning / Transportation Planning	Production Planning	Materials Management	Service Execution
Demand Sensing and Demand Execution			Supply Sensing and Supply Execution		
		Available-to-Promise (ATP) Functionality			
Demand Visibility / Channel Partner Network Collaboration	Order Management	Warehouse Management / Transportation Execution	Digital Manufacturing / Manufacturing Execution	Supply Visibility / Supplier Network Collaboration	Warranty Execution

These new advances in business analytics will allow the line-of-business user to sense channel demand from the customer back, test and learn in real-time, and map multiple "ifs" to multiple "thens" to orchestrate demand and supply. We're moving into the world of big data supply chains and outside-in processes. Here are some examples:

- **Digital manufacturing** — The use of mobility in manufacturing is defining digital manufacturing. Here, sensing real-time equipment status and scheduling based on actual conditions allow companies to move from a near-real-time to a real-time response for manufacturing planning. No longer does maintenance need to be based on mean-time failure. Instead, it can be based on actual operating conditions of real equipment output — pumps, conveyor motors, and filler heads — to improve the certainty of manufacturing output.

- **Orchestrating demand and supply** — We know that a customer is not a customer and an order is not an order, but there's no way to orchestrate this. Once determined, it isn't possible in today's systems to manage a rule set to ensure that the highest-priority customers get the highest priority for inventory, or for companies to manage operations to ensure that the lowest-cost operations are used to fill the customer order. These new forms of analytics enable new sets of trade-offs horizontally. I would love to see supply chain planning vendors embed the combination of Enterra Solutions and SignalDemand to orchestrate demand and supply.

- **Channel sensing and the redefinition of order management** — Similarly, I would love to see the roll-up of demand vendors — a demand signal repository vendor such as Relational Solutions, Retail Solutions, or Vision Chain (now Orchestro) with a demand-sensing vendor such as Terra Technology — to translate demand from the channel to the enterprise and drive priorities in order fulfillment.

- **Network design and supply chain visualization** — It's good to see the LLamasoft solution for network design being applied more widely. This more advanced capability for optimization and simulation can be used for operational and tactical decision-making. Today's solutions lack sufficient visibility for teams to quickly make cross-functional decisions.

The Trailblazers of Supply Chain Planning Technologies

I recently wrote about the evolution of supply chain planning. In my blog post, I commented on how little supply chain planning has changed in its twenty-year evolution. As I worked with clients this week, I had a long and hard talk with myself, since I'm part of the problem. I, like other analysts, am stuck in the traditional software, advanced planning system (APS) paradigm.

I want to pay homage to the trailblazers, so here's a look at the companies that are challenging the traditional APS models and trying to forge a new path. As a CEO of a startup myself, I understand how hard it is to pave a new road forward. Here, I share insights on four enterprise solutions.

Kinaxis

The Kinaxis solution is probably one of the most misunderstood supply chain planning platforms. With its origins in "fast MRP," the company has gone through multiple name changes to establish an identity and gain market traction. It's a flexible, in-memory model and platform that enable visibility, demand and supply balancing, what-if analysis, allocation, and available-to-promise (ATP) functionality. Throwing APS tradition to the wind, Kinaxis branded the term "RapidResponse" five years ago, and has recently been pushing the promise of the supply chain control tower.

Leaving the recent Kinexions, Kinaxis' user meeting, I was struck by three things. First, the company's work on mobility and defining the user experience on a mobile application is very cool. Second, the flexibility of the Kinaxis solution makes the product hard to message, but the clients that have figured it out are very happy. Third, the solution is most often deployed in material-intensive supply chains for what-if simulation and visibility. It's a cloud-based solution that scales easily for hundreds of users, and it has helped many clients that were too constrained by the inflexibility of the traditional APS platform.

At the conference, I heard many clients speaking freely about the deployment of Kinaxis, and the turning off of Oracle and SAP APS solutions. Many were almost giddy. The ease of use of the Kinaxis system was freeing for their teams.

Logility

I like the work that Logility has done in the redefinition of demand planning. Its work on New Product Profiler (a tool designed to help forecast new products) and Proportional Profile Planning (for attribute-based planning) is very encouraging. It should be considered by all Logility customers struggling with demand accuracy in new product launch and promotion management.

Solvoyo

I've spent time in Istanbul discussing the evolution of concurrent planning with some of the best minds in supply chain operations research. Many of you may recall the great work that Koray Dogan and Omer Bakkalbasi did at i2 Technologies. They are now teamed together at Solvoyo, working on the development of concurrent planning.

Essentially, the team is removing the partitions between network design, sales and operations planning (S&OP), inventory optimization, fulfillment, and transportation planning. Supply chain planning originally had to be compartmentalized to enable optimization solvers to run within a feasible time frame. However, with the advent of cloud computing and more advanced optimization techniques, the team at Solvoyo is using parallel processing in the cloud at Amazon to provide decisions on demand (that is, software as a service that delivers the output and decisions integrating with the client's existing software). As a result, the solution is solving inventory, transportation, and fulfillment in one model across strategic, tactical, operational, and executional horizons. Is this important? Yes, and for three reasons: the solution's depth, its scalability, and the bringing of the decisions on demand helps companies that are struggling to get and retain talent.

Inventory problems solved in isolation have had little adoption. Inventory needs to be part of a deeper, more connected solution. The Solvoyo technologies allow users to evaluate the form and function of inventory in network design, and connect it to fulfillment and transportation planning. For an old gal who has worked for years in supply chain planning, I love seeing this new definition.

Terra Technology

Terra Technology calls its solution Demand Sensing, and with twenty consumer goods companies using it, the company is attempting to gain new clients in distribution-centric industries that are

not consumer goods (for example, distribution, chemical processing, food manufacturing, and apparel). The solution replaces rules-based forecast consumption, which improves the translation of demand from a tactical forecast to a more usable and accurate demand signal for fulfillment. Companies using the Terra solution are averaging a 10% reduction in inventory on the balance sheet and an improvement in customer service fulfillment. However, despite seven years of product marketing, the company is still not well-understood by prospects. Because of this, ongoing dialogues with the buyers are required.

Although the replacement of rules-based demand consumption may seem like a small thing, the impact is significant, and the math hasn't been matched by the several "wannabe" competitors that have tried.

I raise my glass and applaud these innovators. Each of them has attempted to blaze a new trail in their own way. However, they are fighting bigger competitors that have done less platform innovation and charge much more for their solutions, but are more aggressive in marketing. Additionally, the higher costs of the extended ERP solutions make them much more desirable for large system integrators to implement and recommend.

Do No Harm

Today, nine out of ten supply chains are stuck. Despite two decades of advancement in supply chain technologies, companies are struggling to gain balance at the intersection of operating margin, inventory turns, and case fulfillment. With market volatility increasing, supply chains can respond, but they cannot sense and are slow to adapt.

Over the course of the last year, I've written about this extensively. The research that I've conducted has enabled me to look at this holistically, which, for me, has brought a discovery. I've kicked around in the supply chain space since the 1980s, believing that the first generation of supply chain systems would improve operations to a greater degree than what actually happened. As an analyst, I've predicted great things that didn't happen. Recently, I've even done a mea culpa.

As a result, I'm trying to be more careful and not overhype the market. When I left AMR Research, I invested over $400,000 to build a database of supply chain financial ratios to correlate supply chain results. My goal is to understand the impact of technologies and processes, although it's easier said than done. After three years of research, I've just refined the methodology to start pulling the trends.

I've learned that supply chain systems are more complex than I originally thought, and that the relationships between supply chain metrics are nonlinear. I've also learned that I need a large data pool to derive the type of analysis that I want to publish. It takes more than one or two respondents from a company.

I need to finish the work, but in the process, I want to do no harm.

Why It Matters

Today, we have a number of burning platforms. Recently, I spoke to a major European retailer that lost 5% of its grocery revenue to Amazon in the first quarter of 2014. It's clear to this company that Amazon is going to be anything that it wants to be. The retailer knew it needed to defend its turf. In a similar vein, a major third-party logistics provider that I spoke to at eyefortransport is considering discontinuing the traditional storage of spare parts and initiating a new

service to do 3D printing of parts on demand. There are many tipping points, and companies want to know what can drive the greatest value.
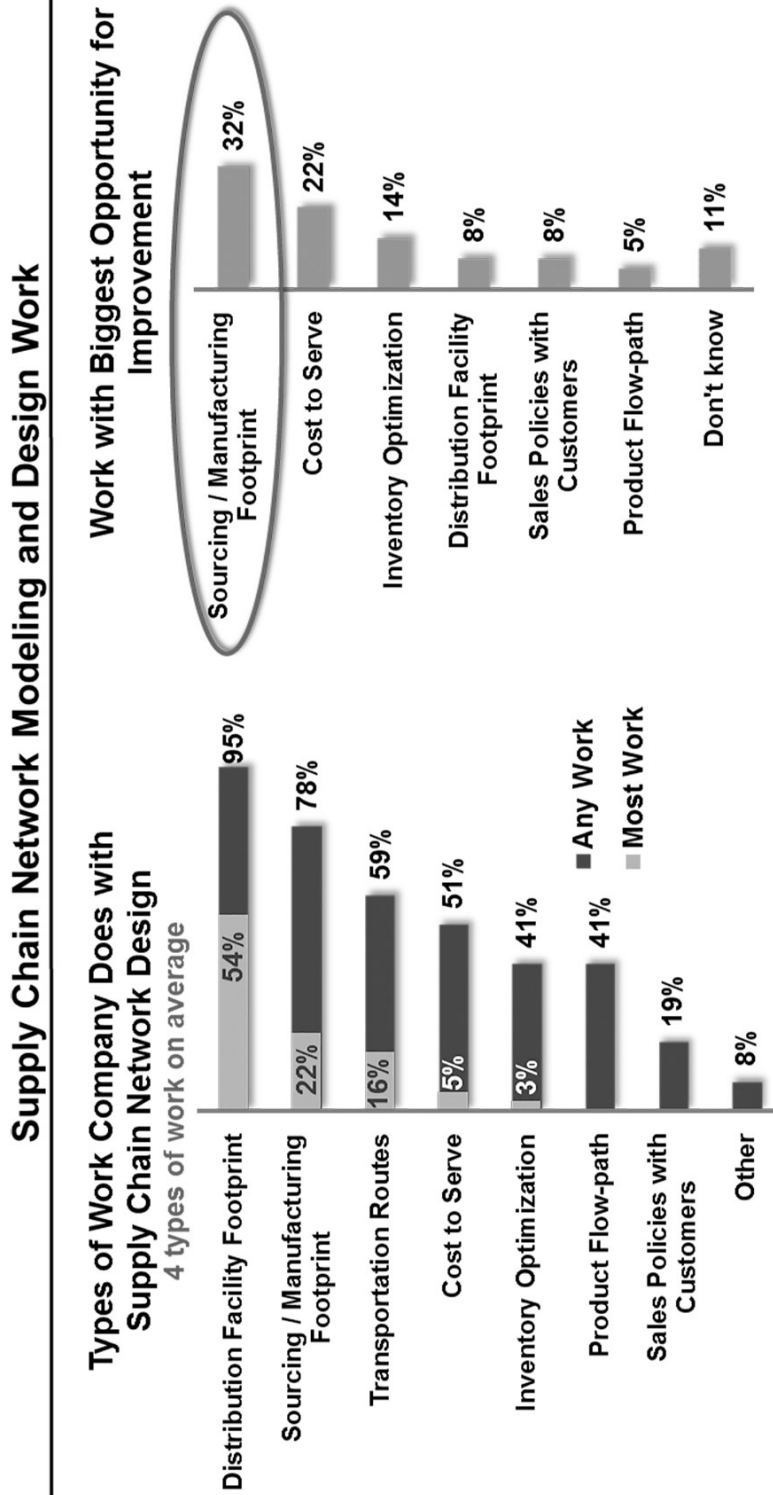
What I See in the Data

In my work on the Supply Chain Index, I see that the companies I recognize as doing network design well are rising faster on the list. Network design technologies have changed a lot in the last decade. (I sometimes wonder if I should create a new class of technologies for network design tools, since they've changed so much.) The older tools from CAPS Logistics, Strategic Network Optimization (SNO) from Oracle, and Manugistics Network Planning are giving way to new technologies like the LogicTools product (purchased from IBM), the Solvoyo product for concurrent planning, the Quintiq technology for concurrent optimization, and the LLamasoft technology platform for optimization and simulation.

These technologies could solve many problems, allowing us to look at sell, source, make, and deliver together. They enable the evaluation of networks for sales and procurement relationships to optimize the flows both upstream and downstream, and allow for the evaluation of volumetric flows and cost. Optimization and simulation can now be done together as well.

I'm a big fan of these types of technologies. My work on the Supply Chain Index shows me that the companies I consider to be the most mature in their use — General Mills, Intel, Cisco, and Seagate — are outperforming their peers. Is it coincidence? I don't think so. I think that it matters.

I recently spoke at the LLamasoft SummerCon conference and the Qunitiq World Tour. In preparation for these speeches, I did some work on network design case studies and recently completed some quantitative research on the topic. Figure 3 shows a cut of the data.

Figure 3. Supply Chain Network Modeling and Design Work

Supply Chain Network Modeling and Design Work

Types of Work Company Does with Supply Chain Network Design
4 types of work on average

- Distribution Facility Footprint: Most Work 54%, Any Work 95%
- Sourcing / Manufacturing Footprint: Most Work 22%, Any Work 78%
- Transportation Routes: Most Work 16%, Any Work 59%
- Cost to Serve: Most Work 5%, Any Work 51%
- Inventory Optimization: Most Work 3%, Any Work 41%
- Product Flow-path: Any Work 41%
- Sales Policies with Customers: Any Work 19%
- Other: Any Work 8%

■ Any Work   ▪ Most Work

Work with Biggest Opportunity for Improvement

- Sourcing / Manufacturing Footprint: 32%
- Cost to Serve: 22%
- Inventory Optimization: 14%
- Distribution Facility Footprint: 8%
- Sales Policies with Customers: 8%
- Product Flow-path: 5%
- Don't know: 11%

Where Would I Start?

The figure shows the current state of network design usage. As you can see from the data, while companies have increased the frequency of network design work from yearly to quarterly, most of it is still focused on basic network design. The focus is on physical assets. The opportunities are in flows, with the greatest gap in the design of supplier and manufacturing networks. There's a great opportunity for an increased focus on flow-path analysis, and a shift from optimizing inventory levels to optimizing the form and function of inventory in value networks.

But back to my effort to do no harm. In a series of blog posts, I outlined what I would do if I was a supply chain leader managing a company that was stalled at the intersection of inventory turns and operating margin. My first investment would be in network design to holistically design the network. I wouldn't stop with the physical design. Instead, I'd look at network flows, the form and function of inventory, cost-to-serve analysis, and the determination of the supplier network. I'd infuse it into sales and operations planning (S&OP), risk management, and supplier development. I'd build an expertise system in the supply chain center of excellence. I believe that it matters. Although there are many factors that affect corporate performance, as I mentioned previously, the leaders in the implementation of network design technologies are rising up the ranks on the Supply Chain Index and outpacing their peers.

Dreaming of Clouds, Lakes, and Streams

It's morning in Chicago, and I crave coffee. The sun shines brightly out the window, but the noisy city is quiet.

I can't sleep. It's hard to quiet an unquiet mind. Somewhere deep inside me is the need to write this.

I recently spoke at the eyefortransport conference about the big data opportunity in supply chain. But before I go any further, let me give a preamble. I hate the term "big data." It's overhyped and overused, and as a result, it has lost its meaning. I writhe in my seat whenever I hear those words. It's even more painful when I hear others speak about it in regards to driving commercial aspirations without a firm grounding in reality.

When I go to an analytics conference today, I feel like the dumbest person in the room. The rate of change is incredible, and supply chains in the next decade will look vastly different from the ones we see today. We are poised for the third act of supply chain technologies: the new world of best-of-breed technologies.

The reason? Today, we are stuck. Nine out of ten companies are not making progress at the intersection of inventory turns and operating margins. Our supply chains can't meet the requirements of the business. Frustration abounds.

For the supply chain leader, the noise of change is deafening — rising complexity, demand volatility, new business models, commodity volatility, ethical supply chains, collaborative economy — yet our processes and technologies are staid and unwieldy. We are paralyzed by a history that has been transcribed into a canonical myth of "best practices."

Rubbish, I say!

We don't have a big data problem. Instead, and more excitingly, we have a big data opportunity. And it's not driven by data volumes — few companies that I work with have databases larger than a petabyte. Instead, it's driven by the opportunity to use new forms of data and to improve the speed of decision making with increased data velocity.

The Real World

Abby Mayer and I recently presented an update in a webinar on the Supply Chain Index. As I look at the progress of the companies that I've worked with over the last decade, the stories hop off the page — albeit, ones I can never tell because of NDAs. My voice is caged by my promises to my customers.

In one peer group, there are two companies: Company A and Company B. Company A is outperforming the other in very volatile times. It was an early adopter of in-memory analytics for self-service by business users. This company can do what-if analysis and on-demand reporting. It implemented ERP early and stabilized the implementation. It's now working on the adoption of new technologies that many would call "big data."

Company B has implemented ERP three times, and badly. It takes five days for a business leader at the company to get a custom report. All of the custom reporting is done as a service through IT.

Company A sits on one of the largest databases of channel data in the consumer products industry. It can see daily channel data daily by item. Company B reads market data through syndicated sources. It can see more aggregated data with a two-week latency.

I believe that data matters. Every company that I work with that has invested in channel data sensing tells me that it's a project that pays for itself in days, not weeks. But the number-one question that I get is, "What's the business proposition of building a demand signal repository?"

In the real world, we don't wake every morning knowing what questions to ask. The markets are ever-changing. We see data, observe patterns, and want to learn more. The business leaders at Company B are at a clear disadvantage — I can see it in its numbers. However, it's hard to fix what I see into a nice, neat ROI package that would delight a CFO.

Some Context

The big data opportunity doesn't exist in the world we're living in. That's because this opportunity is about the advantages we can garner in the next generation of technologies. For me, it's about

clouds, data lakes, and streams. The financial, insurance, and e-commerce industries are leaders, paving a way for manufacturers to rethink their processes.

I want to break down the barriers for adoption:

- **Clouds** — In supply chain circles, data clouds get the most buzz. We've seen the impact, and the effects are far-reaching. Cloud enables new business models for B2B network providers, in-memory optimization, and new forms of virtualization. Concurrent optimization allows us to "paint outside the lines" of traditional advanced planning system (APS) frameworks. It's powerful. However, cloud is the concept that I find the least exciting when I think about the big data opportunity.
- **Data lakes** — The ability to mine data in data lakes or pools to unearth new opportunities through new forms of analytics using nonrelational techniques is exciting. The mining of structured and unstructured data together ignites my thinking. Today, we don't have an "average customer," yet we broad-brush markets. Our abilities to sense from the outside-in and to listen to the market are too limiting. For example, why are we not using Google search trends as a causal factor for forecasting? Or mining sentiment data for quality insights? The market data is there. We're just not using it because it doesn't fit into our paradigm. We're frozen by our inside-out processes that are powered by relational database thinking of traditional enterprise applications. Our functional silos are struggling to get the technologies of yesteryear to work.
- **Streams** — This is the concept that I find the most exciting. Streaming data is pervasive in e-commerce and also core to the future of supply chain technologies. Why do I feel this way? Most companies are so busy recording transactions into nice, neat rows and columns that the streams are hidden. But encased in the data, we have order streams, shipment streams, payment streams — the list goes on and on. The evolution of big data techniques can allow us to sense changes in these streams quickly and redirect our course. The same principle of streaming data from a temperature-sensing RFID device can be applied to streaming data within the enterprise. The ability to write APIs to data streams and the possibilities for supply chain thrill me.

We attack many business problems too narrowly. Let me give you an example. Does master data management give you a headache? We are hard-coding master data into relational systems, and as

we do, we lose the context. What if we could place enterprise reference data into a data lake that can be assembled through rules-based ontologies and cognitive learning?

The Barriers

There are the three primary obstacles for the line-of-business leader.

The first barrier is that we, as manufacturers and distributors, are cheap. The great minds working on big data opportunities are working in industries where investments in technologies are viewed as mandatory to drive innovation. They're not hampered by a fixed ROI with a three-year payback proven by a two-year pilot.

The second barrier is that we have to retool our minds to understand the opportunity. It requires a new language, an embrace of new concepts, and education. Spend time teaching your team about the new concepts. Here are some to start with: Hadoop, YARN, MapReduce, R, nonrelational data, unstructured data, rules-based ontologies, canonical integration, and cognitive learning. Business leaders need to spend time learning the concepts and brainstorming the use cases. This shift won't come from the IT department — an organization too constrained with fixed budgets, mountains of requests, and traditional vendor interaction. It also won't come from discussions with the traditional vendors, whose advertising you'll find all over airports. Instead, it's found in conferences that are primarily attended by e-commerce pure plays, home entertainment companies, and financial and insurance institutions. Form a small team and learn about the new opportunity.

The third barrier is how we think about technology. We're hard-wired to see technology as a fixed project with a set of defined deliverables. As a result, we're not open to the outcome of what we can learn by testing and learning with new forms of analytics and techniques to seize the big data opportunity. The companies that are doing this well have cross-functional teams that are funded with innovation seed dollars to test new technologies against a business problem. However, there's a major difference between these two trains of thought: the projects are small and iterative — not the massive, large consulting projects of yesteryear.

In short, the biggest barrier is us.

Five Reasons to Care About the E2open/icon-scm Acquisition

The websites are swept clean, the messages honed, and the Wikipedia pages aligned. The E2open marketing machines are spinning. The blogs, social media networks, and pundits are whirring with predictions and accolades. I watch with amusement, and want to offer words of caution.

Let me start with a disclaimer: the Shaman is a curmudgeon. She cannot count the number of supply chain management (SCM) software acquisition announcements that promised 1+1=10. In short, this never becomes the reality. Very few software acquisitions reach their potential, and the ones that have can be counted on one hand.

However, I like this acquisition. It'll make E2open more relevant, and could accelerate the evolution of a new form of marketplace offering. The SCM market is troubled and needs some excitement.

Icon-scm was founded in 1992. The product, a licensed offering, was designed to enable a "rapid response" of what-if analysis in material-centric, discrete supply chains. The company partnered with SAP to launch a product offering, SAP Supply Chain Response Management by icon-scm, in 2010. SAP passed on a thirty-day period of first refusal to acquire the asset, allowing the purchase by E2open on July 31, 2013. This licensed software offering was purchased at slightly under three times the revenue. In 2012, icon-scm had revenue of approximately $10 million. The product was used to improve supply chain decisions in discrete manufacturing companies such as Avnet, HP, Pratt & Whitney, and Western Digital.

Based in Germany, icon-scm and the company leadership team was driven by a very product-based mentality. It was never good at marketing. The company name is hard to say and for clients to remember. I liken it to the Johnny Cash song, "A Boy Named Sue." The company was born into the world with a tough name and faced a tough uphill battle. The founders bet the future of the company on the SAP partnership, but the results were disappointing for both sides.

Over the last decade, icon-scm could never successfully compete with the more aggressively marketed Kinaxis solution. There was a strong preference in the market for a software as a service (SaaS) offering, and Kinaxis was quick to claim that position.

SAP's marketing of icon-scm was one of the most confusing marketing positions in the history of supply chain software. The tension between the SAP sales team to position SAP Advanced Planning Optimization (APO) and SAP Supply Chain Response Management by icon-scm was always tough.

With all of this as a preamble and background, let me share five reasons why I think that you, a supply chain leader, should care.

No. 1: Execution Is Key

E2open users need to get involved. When the hype settles, it'll be about execution for E2open. With all software acquisitions, there are trade-offs. The E2open client base is very loyal and long term. Now is the time for the E2open client base to get involved with E2open management to ensure that product roadmap trade-offs are in its best interests. Act now to avoid a surprise. I expect E2open to continue to acquire additional assets and build a stronger presence in the supply chain market.

No. 2: Marketplace Offerings Are Gaining Steam

The race is on, with a new form of marketplace offering emerging. The battle lines to build inter-enterprise supply chain solutions are drawn. SAP is betting on the Ariba platform. Elemica, E2open, and GT Nexus are improving their solutions and working on aggressive product solution platforms to provide new value. Each has a different — and improved — position to enhance value chain network visibility and analytics. My bet is on the evolving best-of-breed provider landscape. (I find it hard to see the value in using the Ariba network that was designed for indirect procurement to seize this market opportunity.)

No. 3: Validation of Rapid Response as a Market Is Good News for Kinaxis

The Canadian planning vendor Kinaxis pioneered the concepts of RapidResponse early in the decade. It was one of the first SCM vendors to move to a SaaS model, which was a gutsy move,

but a right one. The company has waged a tough market battle for recognition. The acquisition of icon-scm by E2open now makes them official competitors and validates the space. The building of icon-scm functionality into the E2open platform should be a wake-up call for Kinaxis to move quickly to evolve its strong, cloud-based architecture to a one-to-many and many-to-many data model to serve the emerging marketplace opportunity. It's my hope that Kinaxis gets more serious about its relationship with GT Nexus.

No. 4: SAP Partnerships Have Less Meaning

Icon-scm and SAP partnered in 2010. Icon-scm was a "preferred partner," with formally announced intentions to incorporate the RapidResponse functionality into its SCM capabilities as an SAP Solution Extension partner. The partnership was on the official SAP product roadmap, which drove the buying decisions of many CIOs. While the press will say that SAP will continue to support this application, over time, clients will have to rethink their platforms and migrate to E2open or embrace Kinaxis.

No. 5: SAP Loses Momentum to Drive Value for Supply Chain Leaders

The right acquisition would have been SAP's acquisition of E2open, with a public disclosure announcing that SAP APO and SAP Supply Network Collaboration (SNC) have not lived up to their promise. In my opinion, the SAP teams need to rewrite their applications to meet clients' needs because they are losing market relevance.

Supply Chain Planning Technology: We Say We Want a Revolution

On my recent trip to Frankfurt, Germany, I uploaded software files while flying over the Atlantic Ocean, using Lufthansa's WiFi service. I was able to work, effectively connected to my office, all the way to Europe. As I uploaded a 5 MG file to SlideShare somewhere over England, I smiled.

Similarly, tonight, as I write this blog post, country music is blaring from my iPhone via MP3 files. Over my lifetime, I have successfully transcended the music experience from records, to tapes, to digital files. The music experience today is far more portable and enjoyable than the days of vinyl. While I still hold on to my Beatles and Rolling Stones records, it's mainly for nostalgic reasons, since they're no longer played.

I smiled this weekend as I unpacked boxes from my recent move. I held my old, well-worn Road Atlas fondly. At one time, it was very important in my life. I have the uncanny ability to get lost every time I turnaround. There were notes in the margins from trips twenty years ago with my young daughter, who is now thirty. I reminisced about the days when you plotted your trip with yellow markers and called ahead for a hotel room. Over my lifetime, I've moved from a paper-based Atlas, to MapQuest, to a satellite-based Garmin, and now to an iPhone. With each transition, my life got easier.

I recently attended SAPICS in South Africa. A speaker on robotics spoke on the potential impact of robotics and manless vehicles to reduce logistics costs by 40%. We see the constant evolution in the warehouse with robotics, voice, and automated vehicles, so why not in planning?

As I sat in my seat and crossed the Atlantic, I asked myself the question, "Why have supply chain planning technologies not been reinvented through technology evolution in a similar manner?" By and large, companies are unhappy with the user experience of supply chain planning and feel that the system output is too difficult to use.

Why hasn't there been a step change? Or, in the words of Rick Sather of Kimberly-Clark, "Why isn't there an app for that?" Here are my answers:

- **Incentives** — The market incentives are aligned to sell traditional software. Companies are risk-averse, and consultants want to sell the software that gives them the greatest margin. The technology evolution reduces the margin for the ecosystem. This surprises many. I recently had a long conversation with a good friend who moved from a manufacturing role, to a consulting role, and now to a supply chain role in a distribution company. She was shocked at the amount of kickbacks made to consulting companies to sell traditional software.
- **Consolidation** — As the software matured, the market consolidated. Most of the software providers' energy was focused on platform migration and the protection of maintenance revenue, which are deterrents for technology innovation. I know of no software company that has successfully migrated its product platform to new technology. In my decade of serving the industry as an analyst, each time that a company attempts to innovate on a new platform, it's pulled back by user enhancements and the need to protect license revenue.
- **History** — The supply chain planning space has a legacy of long and expensive sales cycles, with large payouts to the enterprise sales team. The deals are carefully planned, and the battles are artfully waged. Sales teams have made large sums of money. The movement to cloud computing and mobility reduces the cost of software and changes the business model. No longer are sales teams able to generate the deal sizes and commission checks of yesteryear.
- **No excitement** — The software for supply chain planning isn't as "sexy" in the eyes of venture capitalists. Most of the money has poured into social and marketing technologies that are aligned to drive corporate growth. Supply chain problems require an enterprise-class solution that works. For many, this just isn't exciting.

I'm encouraged to be working with several new startups that want to change this picture. They're enjoying the challenge of creating cloud-based optimization solutions, as well as new forms of visualization and analytics for mobile devices. They're poking holes in the old advanced planning footprints of the 1990s and asking me to help them design differently. They understand that the movement to the tightly integrated ERP footprint was a step back for the industry. Their interest is in building effective business networks that can sense and adapt using new techniques.

Shouldn't it be this way? Shouldn't technology evolution improve the experience? We shouldn't start with process. Instead, we need to ask how the process could be improved with new forms of technology. Don't we need to admit that supply chain planning today is largely legacy, and that, like the Road Atlas I carefully packed away, it also needs to be shelved?

Here's what you can do to change this:

- Encourage innovation. Work with small and innovative solutions, and open up the world of opportunities.
- Push existing technology providers to drive innovation in a meaningful way. Challenge them to think about problems differently.

I look forward to getting your thoughts on these new forms of analytics as they evolve. But to-night, as I recover from my jet lag and tap my foot to my blaring country music, I think that I'll just toddle off to bed now and dream about the world that could be.

Straight Talk on OpenText's Acquisition of GXS

It was gobbledygook. As I listened to the investor relations call on OpenText's intent to buy GXS, that was what I heard — or that was my take, at least. The OpenText script focused on how ECM+EIM=EIM cloud-based services. My reaction was, "Really?"

On the analyst call, I heard abstruse, technical jargon strung together to justify an outcome. I prefer straight talk, and I know my readers do, too, so here's my point of view.

Straight Talk

OpenText announced the intent to buy GXS for $1.2 billion ($800 million in debt, $265 million in cash, and $100 million in equity). The purchase price for GXS is approximately 2.4 times 2012 revenue. This is a low multiple.

I get it. GXS has been saddled with debt and struggling in a commoditized market. It's been tough for the company to upgrade its architecture. However, when I compare the purchase price of GXS to the current trading value of E2open at six times revenue, I feel bad.

Many might ask, "Who is OpenText?" OpenText is a $1.2 billion technology software provider with roots in content management and the sharing of digital assets. The company is now twenty-two years old, with a strong reputation for delivering products for marketing groups and e-commerce.

Why Does It Matter?

Electronic data interchange (EDI) is the workhorse of the extended value network. We're at the dawn of building meaningful business networks. Today, despite the emergence of other means of B2B interconnectivity, over 50% of orders and purchase orders move through the extended value network via EDI. Only 7% move via trading networks. EDI is, in essence, network "plumbing," connecting, transforming, and extracting data that needs to be harmonized, synchronized, and cleansed.

That said, we all know that plumbing isn't sexy.

The race is on to automate the extended value network. Historically, the EDI providers have offered a valuable service. EDI is much like the sewer systems running underneath our cities — it's dirty, specialized work. EDI providers speak their own language. Being a successful player in this market requires both a strong technical and process mastery. The processes need to be built with the end in mind.

At the start of the decade, there were three large, standalone B2B EDI providers: GXS, Inovis, and Sterling Commerce. With the announcement of OpenText's offer to pay $1.07 billion in cash and $100 million of its stock for GXS, those three large players are now gone, absorbed into larger entities. GXS will become a subsidiary of OpenText within the next quarter. The leader of the supply chain organization doesn't have a clue about the definitions of ECM, EIM or EIM cloud-based services. They just want something that works reliably.

My Take

As I listened to the OpenText summary of why they bought GXS, I hung my head. I liked GXS. I felt bad for the GXS employees that I knew and respected. The investor summary of the acquisition was laden with IT acronyms and gobbledygook, the "technobabble" layered thick throughout the call. When IBM purchased Sterling Commerce, Sterling became less important to the market. Based on the OpenText call, I fear that the same could happen with GXS. It's a risk for the extended supply chain and business leaders.

GXS is a far cry from an EIM solution, which is a combination of enterprise integration and content management. There are two to three degrees of separation in the technology stack. As a result, this acquisition is good news for the smaller and more nimble B2B service providers, such as Datalliance, Descartes, E2open, Elemica, Exostar, GT Nexus, iTradeNetwork (Roper Industries), and SPS Commerce. It will produce neutral results for SAP. (I also believe that SAP and its work with Ariba to build business networks will become one of OpenText's largest competitors.)

Solutions to connect the extended business network won't come from ERP, and the solutions built for CRM and supplier relationship management (SRM) aren't the natural adapters or APIs to connect it either. It's not about integration. This view is too simplistic. Instead, workflow, synchronization, translation, and harmonization are needed.

My Wish for OpenText

Many supply chain leaders depend on their value-added networks (VANs) for services. Please don't mess this up, OpenText. Plumbing isn't sexy, but it is necessary.

My wish is for you to understand the business proposition, and then apply technology. The market needs a leader. Step up and fill those shoes, but please leave the gobbledygook at home.

The Third Act

The stage is set. We are now in the third act. In the script, supply chain leaders are attempting to get value from supply chain software. The pressures are mounting, the service failures are many, and the drama is high. The leaders are reaching out for answers.

Technologies have advanced, and supply chain leaders believe that there *must* be a better way. It's less about the cost of software than the delivery of value. The stakes are high, since their careers ride on their software decisions.

If they have gray hair like me, these leaders have survived the first two acts of the play, and, as a result, they are callous and skeptical. The stories of "consultant answers" fill their bookshelves like fairy tales stacked on my grandson's shelf. They know that there's something better out there, and they are looking for it.

Let's look deeper at the plot of the first two acts.

The first act centered on the "birth" of supply chain planning software. The best-of-breed market held a cast of characters, and the stories of their "bad behavior" are now legend. Unfortunately, the fight became one of market share, with companies such as i2 Technologies and Manugistics exchanging blows. As they battled, the focus on innovation and serving the customer dissipated.

The second act featured the promise of the "integrated supply chain." In this act, very large systems were sold with big price tags and high expectations. The market became mired with large implementations and expensive consulting engagements. The planning systems in this era of software were inferior to the first generation, but they were sold with the belief that 80% would be sufficient and that one size could fit all. But supply chain leaders now know that this wasn't the answer.

In the third act, companies are waking up. The business requirements have changed: growth has stalled, and demand and supply volatility is greater. The business pain is high, with the complexity of managing a global supply chain having changed everything. Uncertainty is rampant. Due to the amount of investment in supply chain technology in the second act, the CIO is dragging his

feet. He doesn't want to talk about a new system or a different approach. The CIO believes that if he just pushes harder on the tightly integrated ERP providers, they will step up to the plate.

This third act is very different. Supply chain matters more than ever, and the CIO plays less of a role. To succeed, line-of-business leaders have to learn about new forms of technology and use their influence to drive supply chain innovation. The traditional definitions of architectures disappear.

Here's what I think will happen in the third act:

- **Analyst frameworks matter less.** As the supply chain planning and execution technology landscapes get redefined, new software products, services, and taxonomies are defined. As a result, the supply chain technologies of the next five years will be difficult to graph in traditional four-box models.
- **New capabilities up the ante.** While the traditional focus for planning was to take transactional data as an input and drive time-phased data as an output, leaders now know that this isn't sufficient. Technology capabilities up the ante. As a result, the new solutions will focus on sensing flows and patterns, driving visualization and insights, and producing intelligent rules and policies as outputs. It'll be about end-to-end orchestration of volume, mix, and profitability. The inputs will be both structured and unstructured data types. It'll be less about integration and more about data synchronization. New forms of visualization will make decision support easier.
- **Cloud and nonrelational databases drive new capabilities.** The use of the cloud and the evolution of software-as-a-service models will become mainstream.

So, who are the players, and how would I write the script of this act? Let me give it a try:

- **New players change the story.** The rise of the Dutch software solution providers and North American analytics providers changes the course of the play. The conservative, product-centric Dutch offer an alternative to the market, giving the buyer a new set of choices. As the anger rises against JDA Software's and Oracle's maintenance policies, more companies turn to these new solution providers, such as AIMMS, OM Partners, Ortec, and Quintiq. As a result, JDA and Oracle will become less relevant.

- **New forms of analytics and concurrent planning first confuses, and then advances, the market.** Technology providers such as DecisionNext, Enterra, LLamasoft, o9 Solutions, Solvoyo, Terra Technology, and ToolsGroup offer new capabilities and possibilities. With the confusion, business leaders have to reskill to understand the new opportunity. As the curtain rises, the first set of demand architectures is unveiled. Supply chain analytics combine advanced optimization with cognitive learning to drive new levels of insights from the outside-in. For the first time, supply chains can test and learn in-vitro around the clock. The fights between IT and line of business reach fevered pitches, but dissipate when IT understands the capabilities for insights and visualization.

- **SAP stumbles, and then recovers.** SAP — the provider that has built the strongest and most capable system of record, but has failed at delivering excellence in systems of differentiation — is called onto the stage. The company stumbles, and then recovers, at the end of the third act. The announcement of the SAP Advanced Planning Optimization (APO) rewrite onto the HANA platform raises customer ire. As commissions fall for the SAP sales personnel, the company adapts. At the end of the third act, SAP starts to copy the best-of-breed innovation that has powered new levels of corporate performance. The press releases and celebrations are served with great fanfare.

- **Logility and Kinaxis survive and thrive as the "no-nonsense" solutions.** Logility and Kinaxis continue to survive and thrive as the focused vendors. They become the partner of choice, based on industry requirements, for a system of record for companies with $500,000 to $2 billion in revenue.

- **Canonical integration layers and collaborative multiparty applications drive new capabilities.** With the rise and acceptance of B2B supply chain business network providers, electronic data interchange (EDI) value-added networks (VANs) carry fewer messages and are less relevant. New forms of application capabilities are developed and birthed on many-to-many architectures. The business value between a synchronized and a tightly integrated supply chain becomes painfully clear for the manufacturers that fail at the start of the next recession.

- **Infor finds a niche.** The ION architecture and social collaboration with Ming.le offer new opportunities to retrofit very capable old architectures. The pragmatic buyer celebrates the new business model that doesn't require a rip and replace.

Throwing Down the Gauntlet

"We live in a world where supply chains, not companies, compete for market dominance. But companies often have diverging incentives and interests from their supply chain partners, so when they independently strive to optimize their individual objectives, the expected result can be compromised. " — Hau L. Lee in "Triple-A Supply Chains," Harvard Business Review, October 2004

"The idea of the value chain is based on the process view of organizations, the idea of seeing a manufacturing (or service) organization as a system, made up of subsystems each with inputs, transformation processes, and outputs. Inputs, transformation processes, and outputs involve the acquisition and consumption of resources — money, labor, materials, equipment, buildings, land, administration, and management. How value chain activities are carried out determines costs and affects profits." — Institute for Manufacturing, 2013

Tipping points are fascinating to watch. They're even more fun to create.

I want to be part of the evolution that helps leaders redefine strategies based on the changing physics, electronics, and capabilities in value networks.

Tonight, I'm stranded at a hotel in Chicago. Facing a string of canceled flights at O'Hare International Airport, I opted to pull my bags to the hotel across the street, instead of fighting the mayhem. It's 3:00 a.m. The airport is closed for the night. It's quiet, which means it's a good time to think. Instead of watching the clock tick, I've decided to do some writing and throw down the gauntlet for the high-tech value chains to seize new levels of effectiveness.

What Is Value?
When I wrote the book *Bricks Matter*, I cavalierly penned a chapter on the evolution of supply chain thinking from cost to value. It sounds simple, but it's not. I found this out the hard way when Keith Harrison, contributor to the forward of the book, asked me to define what I meant by "value." Keith is the former global product supply officer for P&G, and a person that I greatly respect. I swallowed hard and began the discussion.

It's one thing to write it, but it's a horse of another color to defend it. I think about this discussion with Keith often as I work on the Supply Chain Index and edit the chapters of my new book, *Metrics That Matter.*

I believe that value is what you create. You know when you've created value because it drives improved brand perception, increased sales, or improved market capitalization. "Easier said than done," you might say. I agree.

Let's Take a Hard Look at Value Chains

To understand value creation, we must first understand how companies have made trade-offs. In Figure 4, I share a composite orbit chart of the progress of Cisco, Intel, Samsung, and Flextronics on the Effective Frontier at the intersection of inventory turns and operating margin for 2006–2012.

What can we learn? Three things:

- **A hard-fought and tough journey** — This is a group of leaders. I have great respect for each of them. However, no company in this chart is on a linear path toward improving margin and inventory turns. Instead, it's a gnarly road, with each company struggling to make trade-offs.
- **Efficient supply chains, not effective networks** — Each company operates within its own plane, improving its own potential. We are still very early in the true adoption of value chain concepts. Our current processes and dependencies on Microsoft Excel spreadsheets can't get us to our goal.
- **Risky business** — Contract manufacturers operate at low margins and lack resiliency. The value chain depends on these manufacturers to drive value, but the lack of stability of the business model is a risk for the system.

The investment in technologies has made companies more efficient, but not more effective. This is an important distinction. Why? All of the companies in the chart have improved revenue per employee.

This is the case across industries. Our historic supply chain practices have made companies more efficient, but we haven't made them more effective. Sadly, we also need to admit that we haven't progressed very far on the creation of value networks. We've talked the concepts, but not enabled the processes. So, my question this morning as the sun comes up is, "Could we?"

Yes, We Could
This industry is poised for a tipping point. As we think about this value network and its potential redefinition through new business models, we are ready to change the equation.

Three significant things are happening:

- Flextronics has invested in the development of Elementum. This is a new startup in the B2B network technology space.
- E2open announced the purchase of Serus. This purchase increases E2open's capabilities for seeing into the processes of the outsourced semiconductor network of foundries.
- Kinaxis successfully orchestrated an IPO. New money into Kinaxis, a wider portfolio for E2open, and the evolution of a new player with Elementum could change the equation.

As we move forward, it's important to take a hard look at Figure 4 and ask ourselves the question, "How can we drive greater value into this value network through more effective data sharing, market sensing and translation, and the enablement of the digital supply chain?" I'm stepping forward to throw down the gauntlet.

Figure 4. High-Tech and Electronic Supply Networks

Source: Supply Chain Insights LLC, Corporate Annual Reports 2006-2012
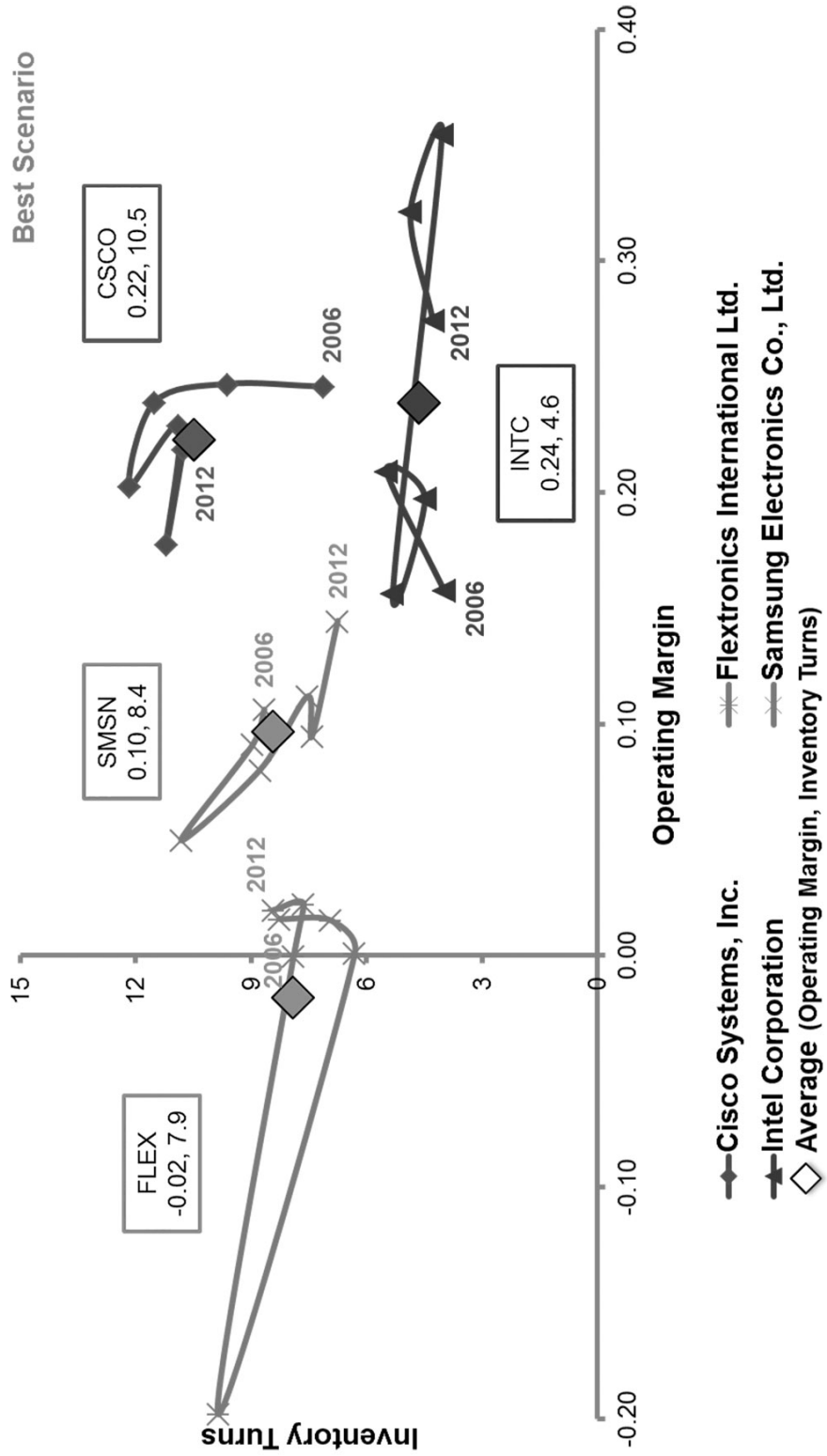
My Advice

The pace of change in this value network is increasing rapidly. As a result, we need to enable the moments of truth in the value chain. This includes the decision to build the digital definition of the product, the decision of when and where to ship, and the decision of which materials to put into which products. It's about more than visibility, and it's not about the automation of yesterday's processes into the cloud. Let's work backward on the announcements:

- Kinaxis should briefly congratulate itself — it was a tough fight — but then move on. It's time to move to a many-to-many data model. The Kinaxis model is an enterprise solution. It lacks the community infrastructure and the canonical integration layer of E2open. The current work on data sharing and control tower for Kinaxis is inside-out, not outside-in. It's an enterprise solution, not a network solution. As a result, it works well for a singular company connecting with its trading network, but not with the interaction needs of the greater community.
- E2open needs to better define the value proposition and its go-to-market messaging, and to continue to add value at the application level. It has fought a hard fight to evolve through a turbulent decade. It's now time to build out the model.
- Elementum is the new kid on the block, so it's important that it builds a community. It needs to be more than Flextronics.

As we think about the drivers for the tipping points — and the coalescence of new forms of analytics with big data systems, 3D printing, and the Internet of Things — there is a need in this value network to quickly automate the supply chain moments of truth. This is the clear articulation of when and how to make, source, and deliver for the community. It needs to be multitier and many to many.

Without this, the players are stuck. Their current performance is stalled, and their interdependencies are too great to not improve through automation. It's about the network, not the enterprise. It's about the new definition of the digital supply chain. It's about new models. This is the challenge.

I've thrown down the gauntlet. The race is on. Let's see who delivers.
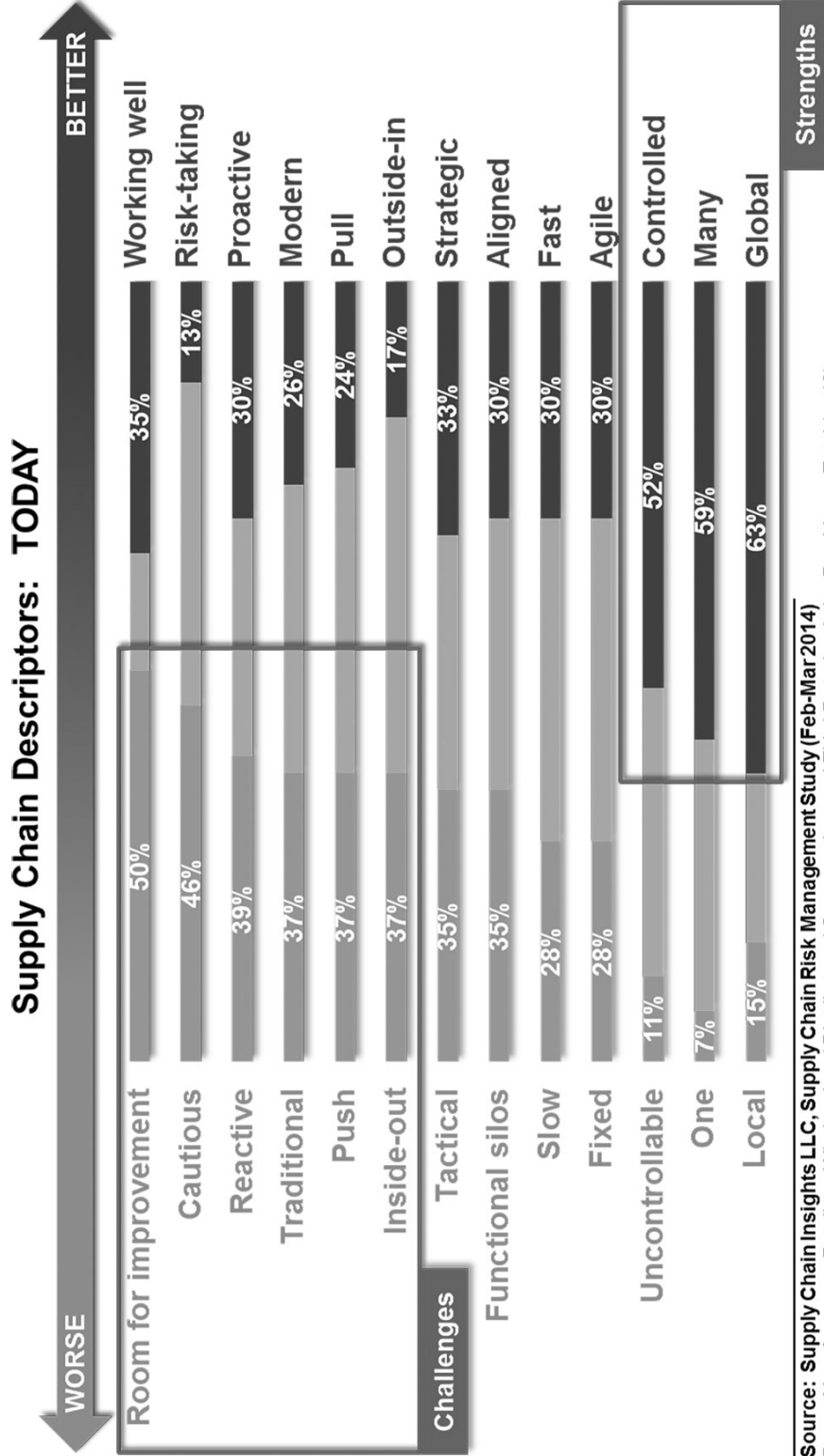
Time for a Mea Culpa

It's a slow week. Most of my friends are on vacation. Sure, I'd like to be on vacation with them, but it's just not in the cards.

I have taken myself off the road to write the book *Metrics That Matter*. The process is tedious.

Let me state this for the record: saying that you're going to write a book is far more exciting than writing one. I like to write, but I am 52,000 words into a 90,000-word project, and I'm struggling. My mind says write, but my heart says it's spring — I want to garden! This is why I find it easier to write in the winter. But for now, I've taped a picture on my desk of the vacation that I want to take in May when the book is finished. Until then, I'll have my head down, typing away.

Writing the book is helping me get perspective. Check out Figure 5. For most companies today, there's great room for improvement in the supply chain, which is cautious, reactive, and traditional. Companies, however, want a supply chain that's more aligned and agile. But guess what? We didn't design it to be that way.

Figure 5. Current State of Supply Chains

Supply Chain Descriptors: TODAY

WORSE — BETTER

Descriptor (Challenge / Strength)	Room for improvement / Worse	Working well / Better
Working well / Room for improvement	50%	35%
Risk-taking / Cautious	46%	13%
Proactive / Reactive	39%	30%
Modern / Traditional	37%	26%
Pull / Push	37%	24%
Outside-in / Inside-out	37%	17%
Strategic / Tactical	35%	33%
Aligned / Functional silos	35%	30%
Fast / Slow	28%	30%
Agile / Fixed	28%	30%
Controlled / Uncontrollable	11%	52%
Many / One	7%	59%
Global / Local	15%	63%

Challenges

Strengths

Source: **Supply Chain Insights LLC, Supply Chain Risk Management Study (Feb-Mar 2014)**
Base: Manufacturers, Retailers, Wholesalers / Distributors / Co-operatives and Third Party Logistics Providers – Total (n=46)
Q23. How would you describe your supply chain today? For each of the following pairs of words, please pick the one word or phrase that best describes your supply chain.

Some Stories From the Road

I recently sat before a board, discussing how a company could exceed expectations in the delivery of return on invested capital (ROIC) and superior operating margins, but fail at the delivery of customer service and inventory.

I also went to see a supply chain leader that spoke of how a "tightly integrated" global supply chain was making things worse for him. His demand signal was worse in global markets, especially Brazil. Because he had reduced his buffers — both inventory and manufacturing — and built a push-based supply chain that used a forecasted demand signal, he was failing in many markets.

I recently worked with another company that personifies the words "cautious" and "conservative."

All three of these companies have goals to be agile and aligned, but their continuous improvement processes are making steady improvement on an efficient supply chain model that is anything but agile or aligned.

Many Ironies

There are too many to list here, but let me give you a few:

- Companies say that they want to build the end-to-end supply chain from the customer's customer to the supplier's supplier, but the investment is primarily in enterprise systems.
- Supply chain leaders will state that they want to be innovative and try new technologies. However, in the next sentence, they'll ask for a statement of a definitive ROI for a project. How can you drive innovation if you only want to try a project with a definitive ROI?
- New forms of analytics allow us to see demand patterns and translate actual channel demand ten to forty times faster, but companies are slow to adopt the techniques.
- As growth has slowed, and with global compliance requirements increasing, supply chain matters more, but is understood less.
- Nine out of ten companies are stuck at the intersection of operating margin and inventory turns, and they don't know what to do about it.
- Corporate social responsibility and the sustainable supply chain matters. Sixty-five percent of nonrenewable resources lie outside the four walls of the enterprise, but only 21% of compa-
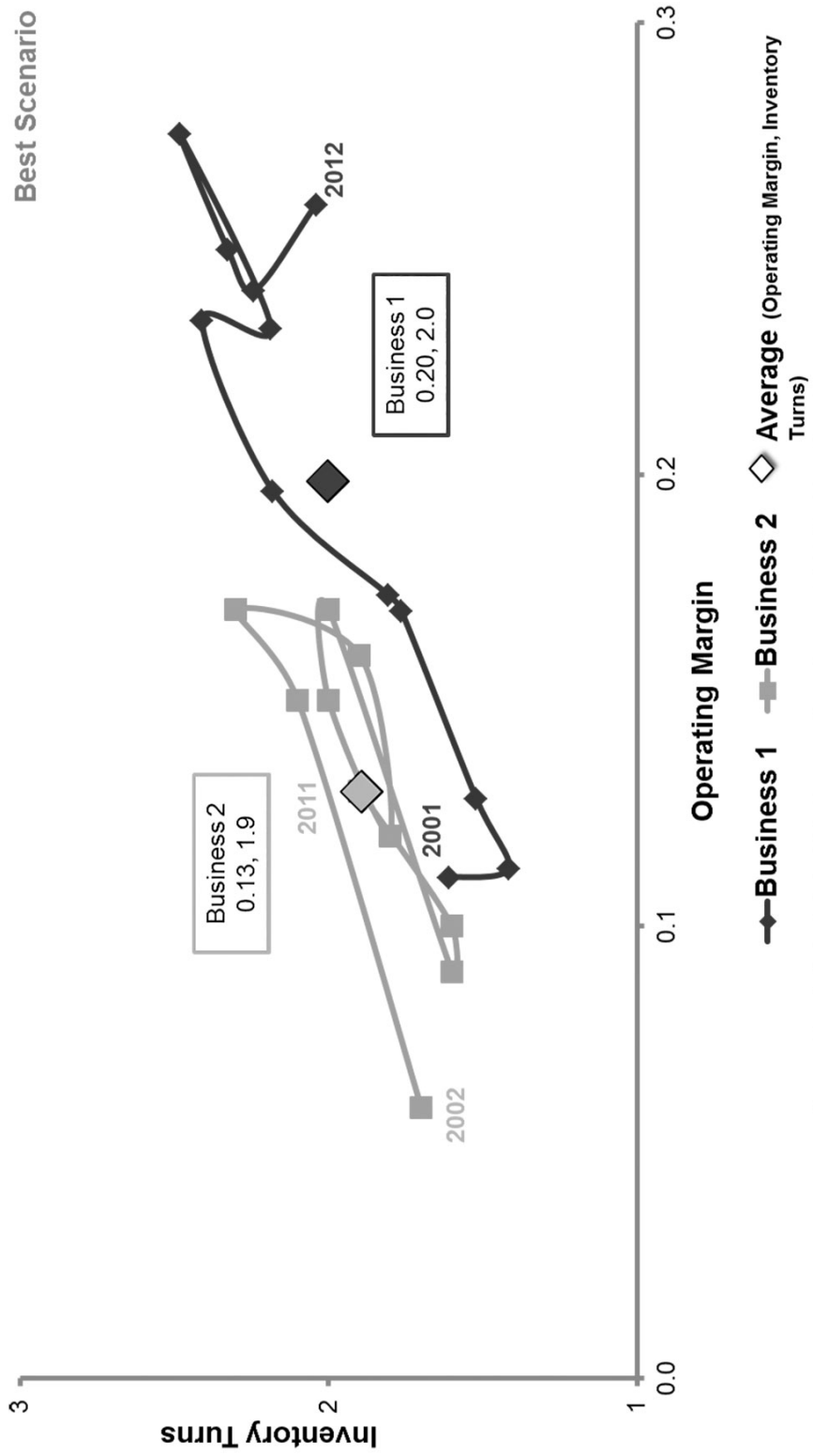
nies are actively trying to work with suppliers on the reduction of carbon, water, and energy footprints in the extended supply chain.

The Answer Lies in Leadership

I encourage all supply chain leaders to have an "oops" day. What's an "oops" day? It's one where you have a "mea culpa" meeting with your team, one where you don't pretend that everything is wonderful, and teams don't prepare pretty charts to tell you that everything is glorious. Instead, you book the biggest conference room in the building and invite a cross-functional team to review what happened in the previous year.
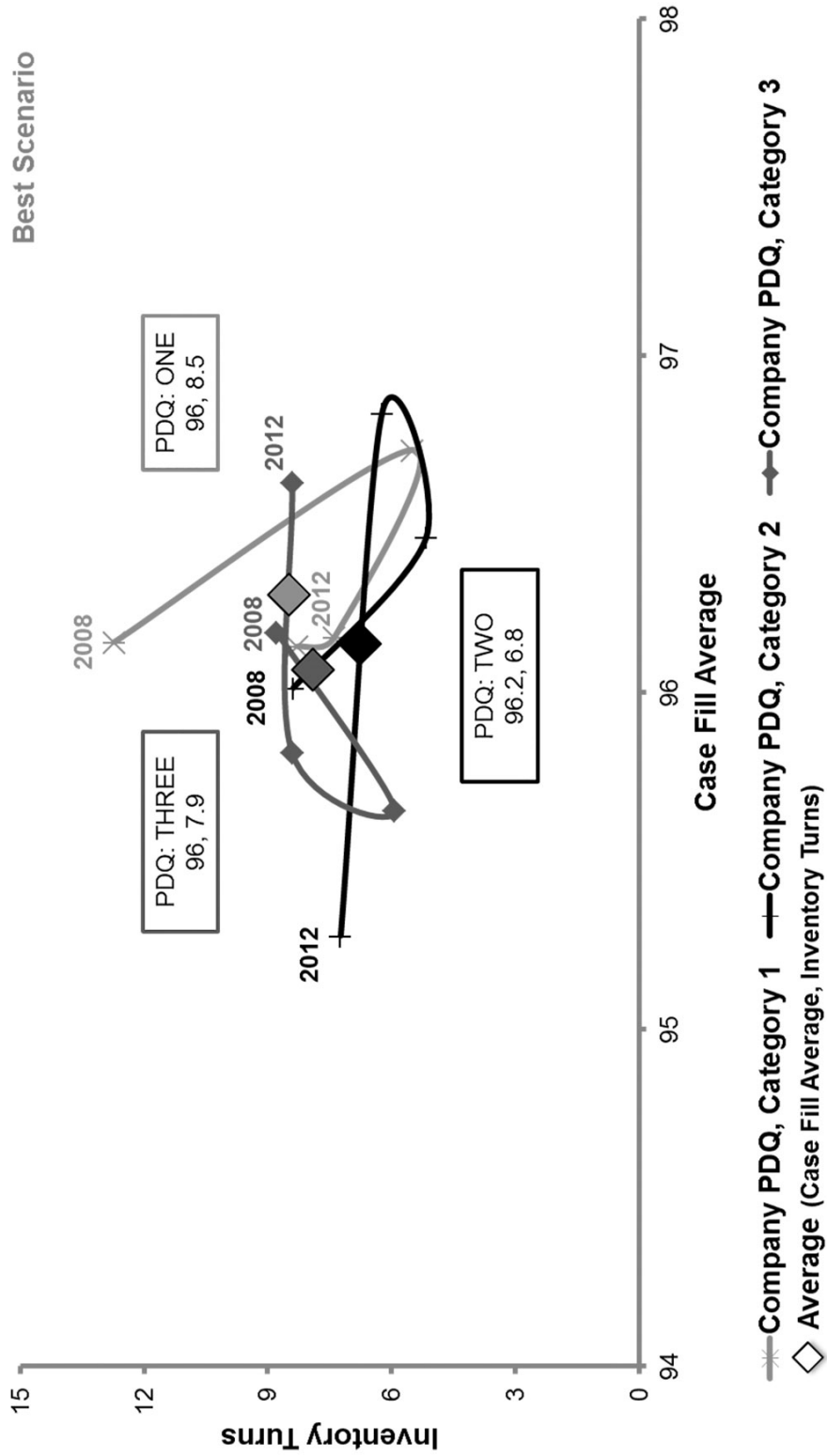
Before the session, ask a small group to chart your progress on the Effective Frontier using orbit charts. Figures 6 and 7 are some examples (see the next two pages). Note that, on the chart of inventory turns versus operating margin, one division is making progress, while the other isn't. In parallel, on customer service, one category is making progress, while two are not. This is common.

Figure 6. An Orbit Chart of Performance Comparing Two Divisions Within a Company

Best Scenario

2012

Business 1
0.20, 2.0

Business 2
0.13, 1.9

2011

2001

2002

Operating Margin

Inventory Turns

◆ Business 1   ■ Business 2   ◇ **Average** (Operating Margin, Inventory Turns)

Source: Supply Chain Insights LLC, Corporate Annual Reports 2001-2012 from One Source

Figure 7. An Orbit Chart of Customer Service (Case Fill) Versus Inventory Turns

Best Scenario

PDQ: ONE
96, 8.5

PDQ: THREE
96, 7.9

PDQ: TWO
96.2, 6.8

2012

2008

2012

2008 2008

2012

2008

2012

Case Fill Average

Inventory Turns

Source: Supply Chain Insights LLC, Corporate Annual Reports 2008-2012

— Company PDQ, Category 1 — Company PDQ, Category 2 — Company PDQ, Category 3
◇ Average (Case Fill Average, Inventory Turns)

The issue? The company was doing well on the management of a regional supply chain, but failing in managing products across geographies for a global supply chain. IT hadn't adopted work processes that were more global.

We often find that companies have better performance in the management of regional supply chains, where the sources of supply are in the same market versus the management of products across borders. However, when you chart your own progress, you'll see your own patterns.

Like most companies that I work with, the lines are not linear, and few show a positive trend. This is eye-opening for many, and that's because companies won't see the patterns of the inter-relationships of metrics in a Microsoft Excel spreadsheet. Plus, there is a need to look at the intersections over many years. It's useful to plot progress, and then step back and have a dialogue with the greater organization in the mea culpa meeting.

To get ready for your meeting, ask each person to write down the number of "oops" moments, or issues, that they felt last year.

As part of the meeting, record all of the misses on paper and tape them to the wall. (This is why you need a big wall and lots of paper.)

An "oops moment" could be:

- A product sold more than expected, and your team couldn't meet the customer service goals.
- There were product quality issues. The team had reliability issues with a new product or a launch that created problems.
- The product undersold in the market. Your team couldn't throttle back production fast enough, and the company was stuck with product that had to be written off.
- Employee turnover was high. There was a shortage of planners, which resulted in a problem.

The issues go on and on. But after you've put them on the wall, step back and ask a series of questions:

- What are the root issues?
- Where are we failing?

- What are we doing well?

Then ask the group to work in smaller groups to answer these questions:

- What data is available for use in order to be more responsive?
- Could new forms of analytics help?
- How could we improve outcomes through better work in horizontal processes (for example, sales and operations planning, revenue management, corporate social responsibility, and supplier development)?

Give the group an innovation fund. Ask them where you should spend your money to drive iterative progress. Next, charter a group to get started.

We need to have more honest moments with our teams. Most companies don't have the answers to questions like the ones above. When I work with companies, the gap in supply chain performance is always larger than I expect, yet I see us driving continuous improvement programs to get more efficient at doing what we do today. This isn't the answer. Instead, we need new mental models and new ways of thinking.
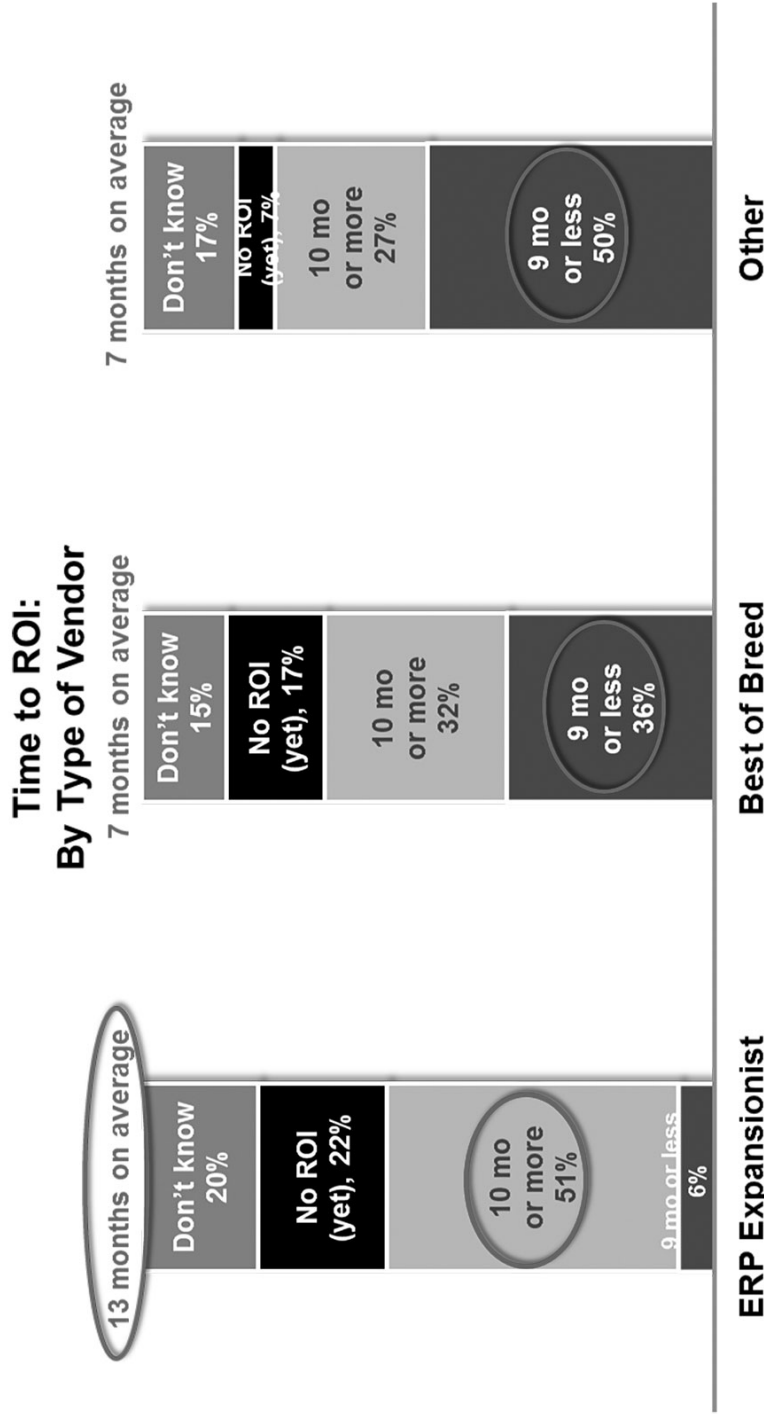
For example, there's promise in the adoption of new forms of analytics. This is an iterative process, not a "big bang" project like ERP.

Was Integrated Planning a Hoax?

And was it intentional or accidental? We'll never know. However, one thing's clear from our recent study of seventy-three manufacturers that use supply chain planning (SCP): companies using best-of-breed solutions implement faster, achieve a quicker ROI, and are more satisfied. When companies tell me that they need to change their current SCP solution from a best-of-breed provider to get a leg up, I ask, "Why?" It makes no sense to me. Here, I want to make my argument and stir a debate.

Let's start with a definition. The term "integrated planning," as used in the Supply Chain Shaman blog, defines the relationship between enterprise resource planning (ERP) and SCP. (It shouldn't be confused with integrated business planning [IBP], which is the process and technology integration of business and supply planning in sales and operations planning.) Over the last decade, many supply chain experts advocated that tighter integration of SCP with ERP would deliver higher value. However, this isn't supported by the facts of a recent study (see Figure 8; at Supply Chain Insights, we conduct twenty quantitative studies a year to understand the impact of technology and process decisions on business results. This is one of the studies in our series.)

Figure 8. Time to ROI by Vendor Type

Time to ROI:
By Type of Vendor

13 months on average

| Don't know 20% | No ROI (yet), 22% | 10 mo or more 51% | 9 mo or less 6% |

ERP Expansionist

7 months on average

| Don't know 15% | No ROI (yet), 17% | 10 mo or more 32% | 9 mo or less 36% |

Best of Breed

7 months on average

| Don't know 17% | No ROI (yet), 7% | 10 mo or more 27% | 9 mo or less 50% |

Other

Source: Supply Chain Insights LLC, Planning Software Study (Feb – June 2014)
Base: Manufacturers, Retailers, Wholesalers/Distributors/Co-operatives and Third-Party Logistics Providers with Demand and/or Supply Planning Software and Know Number of Planning Instances – ERP Expansionist (SAP, Oracle) (n=49 instances), Best of Breed (Logility, JDA) (n=47 instances), Other (n=30 instances)
Q12/20. How soon did your company get a return on your investment (ROI) for this [demand][supply] planning instance? Your best estimate is fine.
◉Higher than other group at 90% or higher level of confidence

Background: My Personal Experience

In the period of 1985–2000, the SCP market was defined by a list of best-of-breed vendors that included names like American Software, Chesapeake, Demantra, Fygir, i2 Technologies, Logility, Manugistics, Mercia, Numetrix, and Red Pepper. The list is long, and most are history. Today, in many organizations, these solutions are legacy.

The SCP market has consolidated. These companies were merged into other entities and/or changed their names: JDA Software acquired Manugistics and i2 Technologies; Fygir and Mercia rolled up into the Infor platform; and Oracle combined the assets of Demantra, Red Pepper, and Numetrix through its multiple acquisitions. Webplan changed its name to Kinaxis. Only Logility and American Software have the same names and business structures.

Now, we have new technology players entering the market, such as AIMMS, Enterra, OM Partners, Quintiq, ToolsGroup, and Terra Technology. For many, it's confusing, but it keeps old gals like me in business.

The period of 2000–2010 was turbulent for these best-of-breed, advanced planning system (APS) technologies. Their available market contracted because of several forces:

- **Mergers and acquisitions** — Through many M&As, the available market for solutions shrunk. This was a barrier for innovation.
- **Competition** — The aggressive marketing of the ERP vendors that were introducing planning suites (led by SAP with its product named SAP Advanced Planning Optimization, or SAP APO) took the market off course. As SAP APO skyrocketed to capture the dominant market share, the best-of-breed vendors couldn't shake the perception that an "integrated solution" was better. It didn't matter that most of them had integrated to SAP suites for over a decade.

During this time, I worked for Manugistics. As I watched the hype of integrated planning swell, I asked, "Why?" It didn't make sense to me. After Manugistics, I worked for two analyst firms, Gartner and AMR Research, and I continued to question if the extended ERP platform that included SCP delivered greater value. I didn't see it. The implementations were longer, the purchase costs were higher, and the functionality was less robust and lacking flexibility. But the positive market perception continued still. It was largely sustained by consulting partners that

made more money on the implementation of larger and more costly projects of less capable solutions.

During this period of time, I tried to highlight this gap in my research. However, it's tough for an analyst to take a stand against the larger ERP vendors. The ERP public relation machines are mighty. They invest heavily in the bigger, more established analyst firms. As a result, it's hard to fight for change in the more established analyst worlds.

This isn't the case today because I am independent. I can voice the truth and call a spade a spade. I've raised the ire of both Oracle and SAP multiple times in an effort to help businesses identify the best partner for SCP to propel their supply chains forward.

Study Results
In early 2014, using the principles of open research, Supply Chain Insights hosted a study on SCP. We currently have seventy-three company respondents, representing 133 planning instances. Here are some of the results that we've collected so far:

- **Extended ERP solution implementations are longer, with a less favorable ROI.** The implementations of extended ERP solutions for demand and tactical supply planning are twenty months, while the best-of-breed solution deployments are averaging eleven months. (The predominate ERP SCP solution for the respondent in the survey is SAP APO. There are few implementations of Infor and Oracle.) The time to achieve ROI averages seven months for a best-of-breed provider and over thirteen months for the extended ERP solution.
- **Demand-planning implementations are faster, with fewer issues than supply.** Demand planning is less industry-specific than supply. While 67% of the demand-planning implementations were at and/or under budget, 55% of the supply-planning implementations were over budget. My take? Supply planning requires a more detailed understanding of SCP. The models are industry-specific. These solutions require greater insights and understanding by the manufacturer and implementing company. Over the last decade, many consulting partners haven't stepped up to this challenge.
- **Does integrated planning make sense, really?** The average company with more than $5 billion in revenue has five ERP instances, three demand instances, and three supply-planning instances. The enterprise environment is complex. It's not as simple as one ERP instance con-

nected to a single SCP implementation. For this reason, there's a greater need for a visualization layer and a planning master data system. As a result, the basic tenants and assumptions of integrated planning dissolve and become less relevant. The argument is becoming less germane.

- **Organizations are not static.** As if this isn't complicated enough, just when many IT managers build a system for tightly integrated planning, there's an M&A event that makes the IT environment even more heterogeneous. In addition, with over 30% of manufacturing and 55% of logistics outsourced, it's now a business network planning problem, not an enterprise one.

- **The ability to use the data is a strain.** While the extended ERP solution architectures may look nice on paper, the reality is that line-of-business users struggle to use the data for what-if analysis or business analytics. The supporting analytics for the extended ERP packages haven't been equal to the business requirements.

What Should You Do?

To move forward, I recommend the following:

Recognize the Facts

The ERP providers are in very different places:

- **SAP** — The SAP team has built an incredible system of record to enable flows from ERP to SCP, but has failed to provide a solution that delivers SCP excellence. Companies with an SAP APO environment should use the solution as a system of record and buy other optimization solutions that are industry-specific to improve decision support. In addition, line-of-business leaders should push for clarity on the SCP footprint and the supporting business intelligence strategy to ensure that they can get data in, conduct what-if analysis, and get data out. Question the consultants who come to your door stating that, "80% is good enough." The study clearly shows that it's not.

- **Oracle** — The Oracle solution is strong in demand and transportation, but weak in tactical supply and production planning. It's not a good system of record. Oracle has cobbled together the acquired assets from the SCP market, and has delivered neither a system of record nor differentiation. They are integrated only by the words on the contract. Instead, what you have is one throat to choke, but, by and large, the references are unfavorable.

- **Infor** — In contrast, Infor has done a better job. The ION integration layer attempts to provide a system of record, and the many SCP solutions acquired through the company's mergers are being rolled up into a framework that's starting to make progress.

Don't Wait

An ROI in less than a year in today's market is an opportunity. Why wait?

Use Talent From the Technology Provider During Implementation

The participants in the study that use consulting talent from the solution providers are more satisfied than those who implement using larger consulting firms. Use the large firms for program management and change management, but let the SCP providers tune and implement the technologies in the SCP market.

Welcome in the Big Data Opportunity

The term "big data" is moving up the charts as a hot topic. Supply Chain Insights recently published our second quantitative study on the evolution of big data concepts, which gave us the opportunity to talk to supply chain leaders about the evolution of technologies and the use of analytics in the race for Supply Chain 2020. We wanted to understand where companies were at in the adoption of big data concepts.

The study was completed by over 120 respondents during June and July 2013. The results can be accessed on the Supply Chain Insights website or through SlideShare.

What Did We Learn?

The adoption of new concepts for big data is a step change for supply chain teams. It's not about force-fitting new forms of data into applications based on relational databases. It can't be treated as an evolution.

What's required is change management. It's about small and iterative projects using new forms of analytics. The projects have to be based on a business problem, and the focus needs to be on continuous learning. This is quite different from the traditional waterfall project approach of mapping "as is" and "to be" states, and managing a large project against a goal. Companies have to be open to the outcome and invest in innovation through analytics.
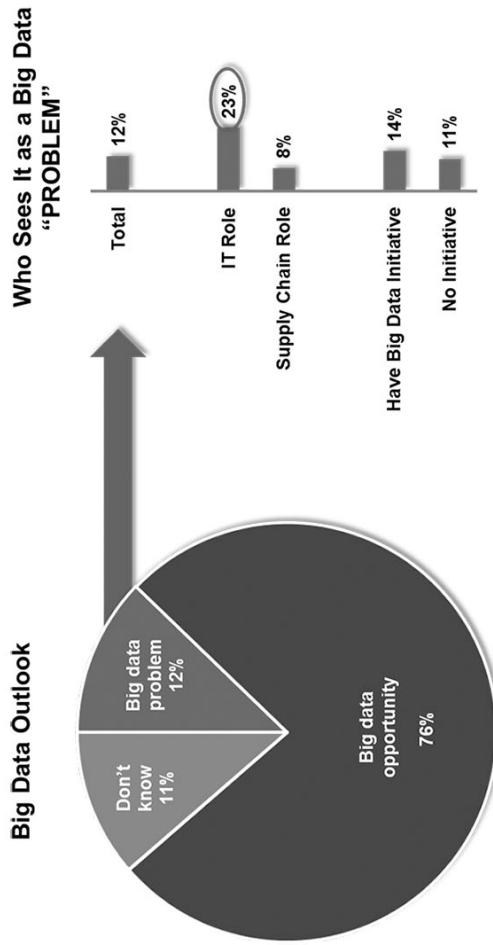
To drive success, companies have to side-step the hype. Although the slides on big data concepts abound, very few technology companies and consulting partners have built solutions to harness this opportunity, and even fewer supply chain leaders are ready to have the discussion. The work by Aster Data (now a division of Teradata), and IBM and Enterra Solutions, on cognitive learning engines look promising. SAS's work on unstructured text mining, Bazaarvoice's efforts on the translation of blog and sentiment data, and the work by APT on test-and-learn strategies are exciting. We're also encouraged by the work on cold chain and serialization by a number of consultants that are working on sensor data and counterfeiting.

The Findings

In our study, big data was defined as "volume that is at least a petabyte, works with a variety of data that goes beyond traditional structured data, and builds processes that are based on an increased velocity of data that is associated with real-time flows." Several trends were found in the results (see Figure 9):
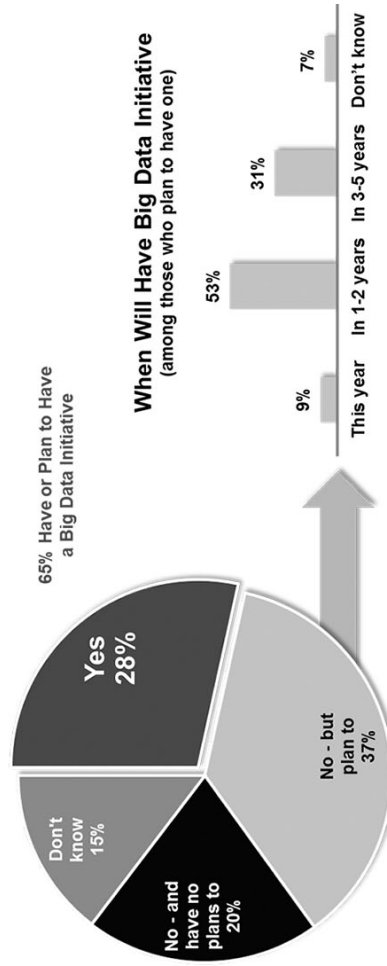
- The biggest opportunity is not with the volume or velocity of data. Instead, it's with the management of opportunity associated with new forms of data. In the study, 76% of companies see big data as an opportunity, and 12% see it as a problem.
- Databases are growing, but they can be managed. Fifteen percent of companies have a database today that's at least a petabyte. The largest databases are not enterprise resource planning (ERP). Instead, they're in the areas of product management or channel data.
- The work is starting: 28% of companies have a big data initiative today, with 37% planning to implement a big data team.
- Companies that have worked on a data-driven culture have a leg up. Organizations that have active teams focused on master data management (MDM) are more likely to have a big data cross-functional team. Fifty-four percent of companies with big data initiatives believe that big data techniques help with MDM.

Figure 9. Big Data Outlook

Who Sees It as a Big Data "PROBLEM"

Total: 12%
IT Role: 23%
Supply Chain Role: 8%
Have Big Data Initiative: 14%
No Initiative: 11%

Big Data Outlook

- Don't know 11%
- Big data problem 12%
- Big data opportunity 76%

Source: **Supply Chain Insights LLC, Big Data Survey (May - June 2013)**
Base: Manufacturers, retailers, wholesalers/distributors/co-operatives or 3PLs familiar with "big data" – Total (n=123), IT Role (n=31), Supply Chain Role (n=38), Have Big Data Initiative (n=35), No Big Data Initiative (n=88)
Q7A. When you think about big data, do you think of it as a big data "problem" or a big data "opportunity?"
○ Higher than other group at 90% or higher level of confidence

When Will Have Big Data Initiative
(among those who plan to have one)

This year: 9%
In 1-2 years: 53%
In 3-5 years: 31%
Don't know: 7%

65% Have or Plan to Have a Big Data Initiative

Have a Big Data Initiative

- Yes 28%
- Don't know 15%
- No - and have no plans to 20%
- No - but plan to 37%

Source: **Supply Chain Insights LLC, Big Data Survey (May - June 2013)**
Base: Manufacturers, retailers, wholesalers/distributors/co-operatives or 3PLs familiar with "big data" – Total (n=123)
Q7. Does your company currently have an initiative in place to evaluate how to use big data?
Base: Plan to have initiative (n=45) Q7B. How soon do you expect to have a big data initiative at your company?