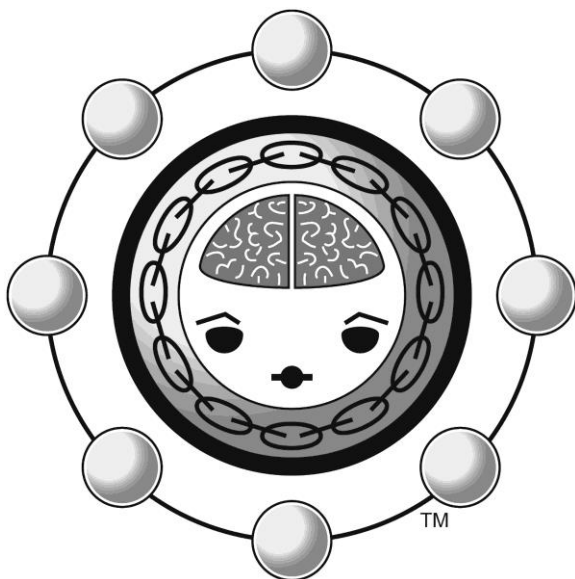


The
Shaman's
Journal
2016



Lora Cecere

The Shaman's Journal 2016



**The
Shaman's
Journal
2016**

**Lora Cecere
a.k.a.
The Shaman**

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DEDICATION

This book is dedicated to the supply chain leadership team seeking answers on how to shift from a cost-based focus to drive value in their value chain.

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Foreword

Over the last decade, the good did not become great. Scorecards were difficult to balance, and leadership teams struggled to define supply chain excellence. Today, executive boards are disappointed. Shareholder activism is growing. Even though companies invested 1.7% of revenue on technology, they have not been able to maximize the value that they were expecting from the information economy.



Productivity stalled in 2004. Today, we find that nine out of ten companies are stuck. To meet the challenge to drive improvement, history cannot be the supply chain leader's guide. The supply chain leader needs to move forward with a focus on serving the customer, sensing flows and translating market shifts to drive an intelligent response.

The goal of this book is to help the supply chain leader on this journey. It is a compilation of short posts written over the past twelve months. Underlying the research are a series of quantitative surveys and financial data analysis by the Supply Chain Insights team.

I want to thank the Supply Chain Insights team—Alison Crawford, Heather Hart, Helen King, Jill Smith, Michael Hambrick, and Regina Denman—for their team spirit and hard work in making this manuscript happen.

Lora Cecere
Founder of Supply Chain Insights

SECTION 1

Leadership in Action

Fizz or Fizzle?

Déjà vu? What is old is often new again. The Coca-Cola Company's supply chain strategy is coming full circle. On March 16, 2016, Coca-Cola announced the sell-off of manufacturing and distribution assets. This asset-light strategy is a reversal of strategy. In 2010 Coke acquired its largest bottler, Coca-Cola Enterprises, for \$12.3 billion.

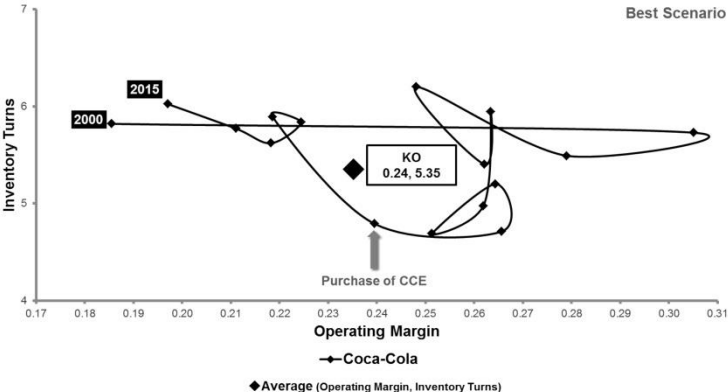
The shift will dramatically change Coke's financials. Revenues are shifting to \$28.5 billion from \$44.3 billion in 2015, and operating margin will jump from 23% to 34%. As a part of the strategy Coke is reducing its headcount by 39,000 employees. Factories, warehouses and trucks will come off Coke's balance sheet in the execution of the Coke Asset-Light strategy execution. In contrast, PepsiCo Inc. announced that it has no plans to sell its two largest U.S. bot-

blers after acquiring them for \$7.8 billion in 2010. The two competitors are executing very different strategies.

Coke is in a battle for the throat. Facing a declining market for carbonated beverages, over the course of the last decade Coke attempted to market/sell water and juice products with limited success.

The driver for the change in strategy is shareholder activism with rumors of a potential takeover by the global beer manufacturers like SAB Miller or InBev. As shown in Figure 1, the orbit chart showing year-over-year changes in inventory turns and operating margin for Coca-Cola is not a pretty picture. As the market for the more profitable black and red traditional Coke products slides, Coca-Cola is struggling to maintain margin. The supply chain tailored for high volume sparkling products is slow to adapt to move slower moving and less profitable still products. As shown in Figure 1, the purchase of Coca-Cola Enterprises (CCE) in 2010 did not stem the tide.

Figure 1. Year-Over-Year Trend for Coca-Cola



Source: Supply Chain Insights LLC, Corporate Annual Reports 2000-2015 from YCharts

Table I. Cross-Industry Comparison of 2006–2015 Averages

Industry Snapshot (2006–2015)

Industry	Year-over-Year Revenue Growth	Operating Margin	Inventory Turns	Cash-to-Cash	Return on Invested Capital (ROIC)	Revenue per Employee (K\$)	SG&A Ratio
Apparel Manufacturing	10% ↓10%	0.10 ↓1%	3.21 ↓35%	93 ↓17%	12 ↓1%	241 ↓34%	32% ↓4%
Beverage	10% ↓13%	0.22 ↓1%	5.68 ↓142%	21 ↓28%	13% ↓15%	449 ↓18%	24% ↓5%
Chemical	4% ↓17%	0.09 N/C	5.17 ↓102%	9 ↓1%	9% ↓1%	574 ↓75%	16% ↓1%
Consumer Packaged Goods	4% ↓17%	0.16 ↓1%	5.25 ↓72%	40 ↓17%	18% ↓3%	446 ↓84%	26% ↓1%
Food	3% ↓5%	0.15 ↓1%	5.96 ↓70%	34 ↓21%	12% N/C	629 ↓184%	19% ↓1%
Grocery Retail	6% ↓9%	0.03 ↓1%	13.04 ↓117%	-10 ↓10%	11% ↓3%	188 ↓34%	12% ↓5%
Mass Retail	6% ↓16%	0.05 ↓1%	4.87 ↓59%	58 ↓11%	7% ↓6%	200 ↓40%	25% N/C
Medical Device	6% ↓2%	0.18 ↓2%	2.41 ↓19%	161 ↓46%	13% ↓3%	326 ↓89%	35% ↓2%
Pharmaceutical	6% ↓40%	0.22 ↓5%	2.43 ↓3%	108 ↓32%	16% ↓3%	518 ↓99%	28% ↓1%
Retail Apparel	10% ↓22%	0.12 ↓5%	4.71 ↓11%	61 ↓7%	18% ↓5%	158 ↓9%	29% ↓27%

Source: Supply Chain Insights 2016. Derived from YCharts. Arrows show percentage change from 2006 to 2015.

The savings from the consolidation did not translate to balance sheet results due to a traditional, functional definition of supply chain excellence within the Coca-Cola organization.

When we look at the beverage industry and the shifts across value networks, you can see in Table 1 that global growth of the beverage category is down 13%. In parallel, when we look at the Supply Chain Metrics That Matter, we see that the operating margin, when we compare the averages in 2015 versus 2006, is up 1% and inventory turns are improved 142%. In essence, the beer manufacturers have outperformed the companies in the carbonated beverage categories.

The question is “Will this asset-light strategy be ‘fizz’ i.e. reversing this trend, or ‘fizzle’ with a continuation of the trend?” Based on our research we believe that it will be fizzle. In this post we make the argument.

A Look at History

Like a pendulum, over the last decade Coke swung back and forth on asset strategies. It started when Coke created a giant U.S. bottler, Coca-Cola Enterprises (CCE), and retained a 49% stake when it went public in 1986. Coke has 68 bottlers in the U.S. today compared with 73 in 2010.

Now Coke is handing its distribution and manufacturing assets back to longtime bottling partners led by North Carolina-based Coca-Cola Bottling Co. Consolidated, Hong Kong’s Swire Pacific Ltd. and Alabama-based Coca-Cola Bottling Co. Historically, these relationships are less contentious. So far Coke has signed deals with about 10 companies, refranchising nearly half of its distribution territory and 17

soda-making plants. It announced last month it would sell the rest by the end of 2017.

Historically, the most successful supply chain outsourcing strategies are in asset-intensive supply chain models like in the semiconductor industry. There is limited success in labor-intensive supply chains like high-tech assembly. The Coke supply chain is a simple mix-and-pack manufacturing process, and the distribution of heavy liquids is through direct store delivery. The market drivers, and the rhythms and cycles within the supply chain, are very different. The Coca-Cola supply chain needs to be optimized to move liquids quickly and effectively based on a strong market signal.

In the carbonated beverage category, we now see the competition is between supply chains. The shift is from a marketing-driven strategy to a market-driven value network. Coca-Cola lags PepsiCo in market sensing and demand translation. Coca-Cola is late to the market to sense market trends through Point of Sale and demographic shifts, and orchestrate these market shifts (purchasing agreements and transportation design) through the value network. The asset-light strategy will be a barrier to Coca-Cola to orchestrate and adapt. It is largely a financial balance sheet maneuver.

With the creation of CCE in 1986, Coca-Cola was the darling of Wall Street. The Company divested assets to improve Return on Invested Capital. However, what was not obvious then, but is all too obvious now, is that when a company sheds assets it is more difficult for the value network to adapt to market shifts. The more extensive the value network, i.e. the number of parties and nodes, the more difficult it is to adapt to changing markets. The shedding of assets without a

redesign in systems to sense and respond will make Coca-Cola less responsive to market shifts.

Rethink the Basics?

In the United States, time will tell if Coca-Cola has learned some important lessons. Battered by retail feedback (a decade of falling scores on third-party surveys of retail perception of the supply chain), declining market share and rising costs, Coca-Cola is struggling. Today, who owns the assets is less important than the ability of the network to sense markets and adapt over time. While Coca-Cola is approaching it as an asset move, there are still three fundamental supply chain issues underlying the decision:

- **Network Goal Alignment:** In the formation of CCE the bottling operations were incented on volume. It sounded like a good idea then. Who could argue with pay based upon more volume on the shelf? However, when carbonated beverage consumption changed due to consumer health and wellness preferences, the Coca-Cola Company wanted to power growth in new products that were lower volume. The value network could not shift incentives based on product mix resulting in a problem. The established incentives with the bottler drove a volume-based response from CCE of more black and red sparkling products favoring the more established high volume Coca-Cola products. There were no incentives to align and compensate supply chain parties for the lumpier, lower volume demand patterns accompanying new product introductions that were being promoted by the powerful Coca-Cola marketing engine. As a result, the

company was not able to achieve the right balance between efficiency and innovation. This was an issue through the CCE formation and divestiture and will remain an issue through the new value network definition.

- **Flexibility to Morph Outside-In:** When the Coca-Cola bottling system was first defined in the United States, Walmart was more regional. As Walmart gained power and established national presence, the regional bottling system became a liability. Walmart wanted a more efficient and responsive supply chain with one voice to the customer and with flawless execution. The Coca-Cola regional system, riddled with goal alignment issues, could not meet the needs of its largest customer. Similarly, the current shift is to e-commerce. The more parties and nodes to align to market shifts delays the value network response.
- **Technology Evolution and Adaptation:** Over the last decade Coca-Cola and PepsiCo's strategies on the use of data and analytics to sense and shape markets is vastly different. While PepsiCo aggressively built sales overlay systems across the bottlers and pushed for the adoption of new technologies to sense demand, Coca-Cola continued to focus inside-out with a myopic view on supply. Coca-Cola held tight to traditional marketing approaches with a functional approach to forecasting and demand management. There is a need to sense and adapt to be outside-in based on the voice of the customer. The capability gap between the two companies on the use of downstream data, to sense and shape demand, over

the last decade is widening resulting in a competitive advantage for PepsiCo. The design of the PepsiCo supply chain system is evolving to be more outside-in with a focus on the market, while the Coca-Cola supply chain continues to be functional with a design from the inside-out.

Today supply chain strategies are less about the company and more on value network design. The demand signal for a consumer value network is a more important asset than the factory assets. Today it is about sensing and driving an adaptive response at the cadence of the market. My thumbs-down vote is due to the lack of this consideration in the design of the asset-light Coca-Cola strategy. However, I think that this is a wonderful case study of supply chain strategy in action.

So, my vote is fizzle. I think that this announcement is a wake-up call that the design of supply chain networks is more important than the design of the company supply chain strategy. While we may shed assets, we must carefully craft strategies to ensure alignment, adaptation, and evolution of the value network.

What does it say to you? I look forward to seeing your comments.

Disgruntled Activists Drive a Merger

*Definition: **Shareholder Activism** is a way in which shareholders can influence a corporation's behavior by exercising their rights as owners. Although shareholders don't run a company, they can influence the board of directors and management. Investopedia*

Heinz. RJR. Nabisco. Kraft. What do these companies have in common? Activists redefined the future of the firm. This weekend Dow and DuPont join the list.

For employees at Dow and DuPont the 2015 winter holiday will be one of uncertainty. Many of my friends at both companies wonder if they will have a job in 2016. The future is uncertain. It is a story of shareholder activism. In 2015 Nelson Peltz became a shareholder activist, at DuPont while Daniel Loeb challenged the strategy of Dow. During the year the fight was long and vicious. This week Dow and

DuPont—two chemical giants—succumbed to shareholder pressure. They agreed to combine assets in a \$130 billion deal that marks the 18th largest merger ever. The new company will be named DowDuPont. The plan is to split the company post-merger into three separate companies: agriculture, material science and specialty products. The split is estimated to take two years to complete.

In the announcement, the joint leadership announced the potential of \$3 billion in annual cost savings, believed to translate into \$30 billion in market value. Before the merger DuPont announced the reduction of 10% of its global workforce of 63,000 employees.

Currently the market is in merger mania. 2015 is a record year for mergers and acquisitions announced by U.S. companies. M&A activity in 2015 hit a record \$4.6 trillion on Monday (source: Dealogic). The DowDuPont proposal becomes the fifth-largest deal behind drug makers Allergan and Pfizer, brewers like Anheuser-Busch and Inbev, energy producers BG Group and Royal Dutch Shell, and the media giants Time Warner and Charter Communications. The combined annual revenue is estimated to be \$83 billion with an operating profit of about \$15 billion and a profit margin of 18%. Post-merger the new entity will have a net debt of \$18.3 billion.

Two years is a long time for a company in a global market, and history shows that it is harder to drive results above peer group as the company grows larger. I question if this deal would have happened without shareholder activism, and would there have been activism if there had been stronger results?



Would Activism Have Happened with a Different Supply Chain Strategy?

While I will never know for sure if supply chain results made a difference, it is clear that both companies' supply chain teams struggled to deliver value to the balance sheet over the course of the last decade. Each company underperformed to their peer group(s).

Dow and DuPont's relative performance to peer group is shown in Table 1. While the average chemical company grew at 6% in 2011-2014, the growth rates of both companies was at 2%.

When it came to defining supply chain excellence each had a different focus. While Dow focused on inventory and employee productivity, Dow was below average on operating margin and Return on Invested Capital (ROIC). In contrast, DuPont performed above average on operating margin and Return on Invested Capital (ROIC), but was below peer group in inventory turns (note the precipitous decline in the orbit chart below). Neither company was successful, despite numerous technology attempts and projects to drive a balanced scorecard of supply chain metrics. As a result, when compared to its peer group, each company rated below average on supply chain improvement (as determined by the Supply Chain Index).

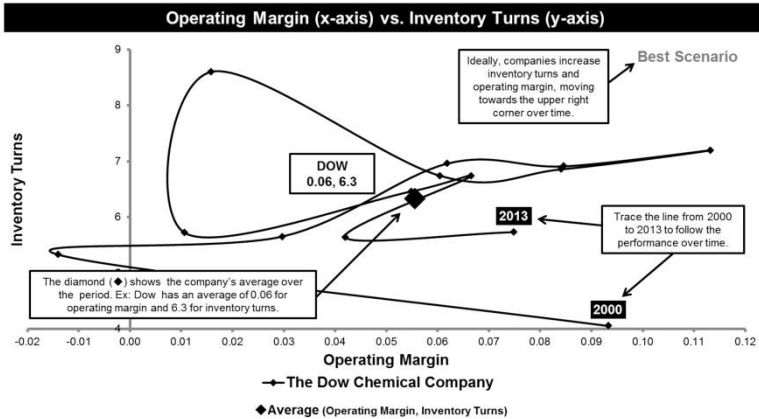
Table 1. Performance and Improvement - Chemical Industry - 2006 - 2014

Company	Performance and Improvement: Chemical												Supply Chain Index Rankings*				
	Growth			Operating Margin			Inventory Turns			Return on Invested Capital				Revenue/Employee (\$K)			
	2006-2014	2009-2014	2011-2014	2006-2014	2009-2014	2011-2014	2006-2014	2009-2014	2011-2014	2006-2014	2009-2014	2011-2014		2006-2014	2009-2014	2011-2014	
Alkzo Nobel	0.04	-0.02	0.00	0.05	0.05	0.03	9	9	9	11%	1%	0%	350	360	376	15	5
BASF	0.08	0.03	0.04	0.11	0.10	0.10	8	8	8	12%	12%	13%	836	832	875	21	13
Bayer	0.07	0.03	0.05	0.09	0.10	0.10	5	6	6	8%	8%	10%	442	449	469	6	9
Cabot	0.07	0.04	0.08	0.06	0.06	0.08	7	7	8	6%	7%	8%	688	710	756	7	8
Chemtura	-0.01	-0.06	-0.02	0.03	0.08	0.12	5	5	6	-9%	-6%	12%	596	572	594	11	23
DuPont	0.03	0.03	0.02	0.11	0.11	0.12	5	5	5	14%	14%	15%	519	455	535	20	7
Eastman Chemical	0.06	0.09	0.13	0.11	0.13	0.14	9	8	8	11%	11%	12%	623	626	686	17	1
Ecolab	0.15	0.17	0.26	0.12	0.12	0.12	12	11	10	12%	10%	7%	249	262	278	16	21
FMC	0.08	0.05	0.07	0.14	0.15	0.17	8	7	7	12%	13%	14%	608	642	658	19	9
H.B. Fuller	0.06	0.08	0.14	0.07	0.07	0.06	10	10	11	8%	8%	8%	449	487	532	22	19
Henkel	0.02	0.01	0.02	0.10	0.12	0.13	9	11	11	9%	10%	11%	283	424	451	22	20
Huntsman Corporation	0.04	0.03	0.06	0.05	0.05	0.06	7	7	7	3%	3%	4%	805	845	904	9	4
International Flavors & Fragrances	0.04	0.03	0.06	0.05	0.05	0.06	5	5	5	13%	14%	14%	470	488	503	12	12
K+S	0.07	-0.04	-0.05	0.16	0.16	0.19	7	6	6	14%	10%	12%	413	398	384	3	16
Kraton Performance Polymers	0.02	0.01	0.01	0.04	0.05	0.04	3	4	4	2%	3%	2%	909	1364	1420	14	3
Lanxess	0.03	0.04	0.04	0.05	0.05	0.05	6	6	6	0%	0%	1%	627	650	696	9	15
Monisanto	0.11	0.06	0.11	0.21	0.23	0.24	5	5	5	14%	14%	15%	480	491	579	17	14
PPG	0.07	0.00	0.04	0.10	0.10	0.11	9	8	9	15%	17%	21%	392	400	416	2	6
Stepan Company	0.08	0.04	0.08	0.05	0.07	0.06	15	14	13	10%	12%	10%	915	924	972	8	2
Syntenta	0.08	0.05	0.07	0.15	0.15	0.15	3	3	3	9%	14%	14%	495	501	519	1	22
The Dow Chemical Co	0.03	0.01	0.02	0.06	0.06	0.07	8	7	7	7%	6%	7%	1112	1065	1106	5	18
Valspar	0.06	0.05	0.09	0.09	0.10	0.09	11	11	11	8%	8%	8%	369	380	406	4	17
W.R. Grace	0.03	0.00	0.05	0.09	0.12	0.15	10	11	11	5%	21%	16%	480	480	493	12	11
Average	0.06	0.03	0.06	0.09	0.10	0.11	8	8	8	8%	9%	10%	570	600	635	NA	NA

Supply Chain Index LLC - Derived from YCharts. *Supply Chain Index Rank = Based on average ranking within industry of Balance (Return on Invested Capital & Revenue Growth Vector Trajectory). Strength (Inventory Turns & Operating Margin Vector Trajectory) and Resiliency (Inventory Turns & Operating Margin Mean Distance)

However, the story is in year-over-year results that cannot be seen in the averages. For both teams supply chain improvement was elusive. As shown in Figure 1, Dow is at the same place at operating margin and inventory turns in 2013 as 2000 despite almost a decade of investment in process improvement. The 2009 Rohm and Haas acquisition for \$16.3 billion threw the Dow supply chain out of balance, while the Pioneer acquisition by DuPont in 1999 for \$7.9 billion shows a similar pattern. As the product portfolios grew more complex, focus was tougher.

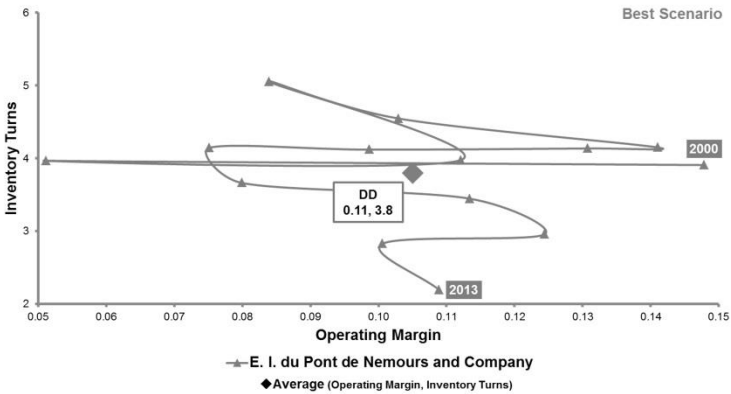
Figure 1. Dow Chemical Orbit Chart



Source: Supply Chain Insights LLC, Corporate Annual Reports 2000-2013 from YCharts

Chemical companies sitting four to five levels back in the value chain struggle to weather economic patterns and lack the margins of consumer products companies that they serve. In this business model supply chain leadership is critical. Both companies were late to name a supply chain leader and grow a cross-functional team. All of this is happening when the market is signaling a recession. A two-year transformation will be even tougher in the face of a recession.

Figure 2. DuPont Orbit Chart



Source: Supply Chain Insights LLC, Corporate Annual Reports 2000-2013 from YCharts

While each company has attempted to up the ante to sell higher-margin products, the struggle is redefinition of culture to be more customer-centric and channel driven. The historic chemical company manufacturing process heritage—where supply chain is a function focused on logistics and order management—is a barrier for both.

Summary

Supply chain leaders take note: Activists want short-term returns. They are impatient. I strongly believe that the delivery of balance sheet performance matters more than ever. I feel that it takes courageous supply chain leadership.

I look forward to hearing your thoughts. Meanwhile, all the best to my friends at the Dow and DuPont companies. May the impact of this acquisition be swift and create opportunity for each of you.

SanDisk's Story of Customer Segmentation Strategies Using Inventory Postponement

***Platitude:** a flat, dull, or trite remark, especially one uttered as if it were fresh or profound. Source: Dictionary.com*

During the year I go to a lot of conferences. In the process I get to hear the presentations of many thought leaders. As I sit on the back row I hear platitudes (a number of concepts positioned at a high level without clarity on how to execute). As supply chain clichés take flight clients struggle with execution. One of these concepts that I hear a lot, but

see few tangible examples of, is the idea of a "*customer-segmented supply chain*."

The discussion of customer-segmented supply chains happens often. When I hear companies discussing the implementation of a customer segmentation strategy, I ask a series of questions:

- Who is your customer? How do they buy from you?
- What are you trying to accomplish through the execution of a customer segmentation strategy? Why does it matter to you?
- How will the policy be executed? Over time, as the business evolves, how will it adapt?
- In the process, how will you measure success?
- Through the evolution, how will you ensure alignment with the commercial teams?

When I ask these questions they look at me like I am the dumbest analyst in the world. I find that most of the time companies cannot answer the first question of "*Who is your customer? How do they buy from you?*" Currently working on a series of surveys to help clients answer these two questions, I struggle with the current state. Most supply chain planning teams do not know their customers.

I find in this world of the global multinational that procurement processes have become convoluted and increasingly complex. (In my opinion we have made procurement increasingly complex without adding value. I could go off on a rant, but I will save you from this. Most clients are well-served to begin their customer-centric discussion by trying to do business with themselves. In my research I find that the companies with the most progressive procurement processes also have the most advanced customer supply chain process evolu-

tion.) Without answering this question of "Who is the customer?" the rest of the discussion is moot.

Today, there is not a well-defined template on how to build and operate a supply chain defined by customer policy and segmentation strategy. I often find that it is a whiteboard activity with good intentions that cannot be actualized. This makes me yawn. I am after real insights for real people making a real difference. Platitudes make me crazy. When I hear them at a conference I squirm uncontrollably in my seat.

My journey to understand SanDisk started in June 2015. We were jointly presenting on a demand-driven webinar. When I heard their story, I scratched my head. For me it was ironic because SanDisk's journey is not about demand. In fact, the teams ignore the forecast. Instead, in the SanDisk journey, they adjusted the speed of response to their customer segments, and actively designed inventory postponement strategies. It is systemic. While I do not consider this case study as a good example of demand-driven processes, I do believe they have done some great work on implementing a customer-segmented supply chain based on postponement. For many companies starting a demand-driven journey, adopting SanDisk's customer-centric strategies would be a great starting point to improve supply chain performance.

SanDisk's Journey to Build a Supply Chain Customer Segmentation Strategy

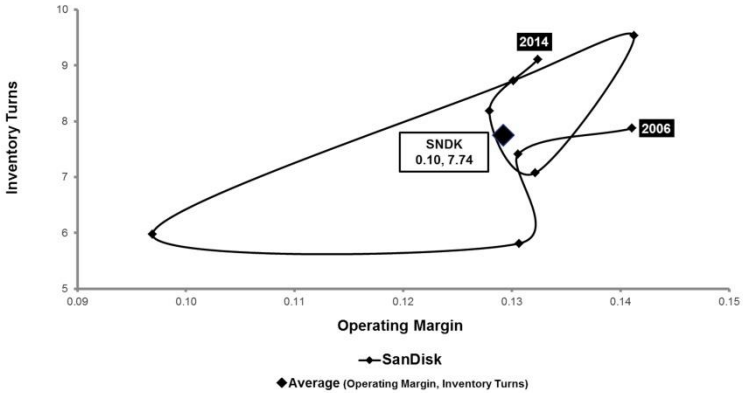
SanDisk Corporation designs, develops and manufactures flash memory storage devices and software. The company is the third largest manufacturer of flash memory in the world. Founded in 1988 in Milpitas, California, SanDisk is publicly traded on NASDAQ with 8,600 employees globally,

and market capitalization in 2015 over \$13 billion. Currently the company is \$6.1B (trailing four quarter financials) with \$1.5 billion in Net Cash on Hand. The company is a Fortune 500 company serving four major markets: Data Centers, Client Computing, Mobile and Connected Devices and the Consumer Markets. The supply chain is vertically integrated and globally ships almost 2 million units daily.



At the Supply Chain Insights Global Summit, I asked Kehat Shahar, Vice President of Supply Chain Planning at the SanDisk Corporation, to speak on the SanDisk journey. I had the opportunity to visit with the SanDisk team in July 2015. As I sat with the team and discussed the future of supply chain, they impressed me with their use of planning tools and their process diligence on building inventory strategies to enable a customer-segmented supply chain. The journey began with a one-size-fits-all approach in 2008, and the policies evolved over the course of the last seven years.

Figure 1. Orbit Chart for SanDisk for 2006-2014



Source: Supply Chain Insights LLC, Corporate Annual Reports 2006-2014 from YCharts

This is a story of a supply chain turnaround. With the downturn of volume in 2008 with the recession, the company shifted to sales incentives based on channel sell-through, implemented cost-to-serve strategies, and actively began the journey to design and implement customer segmentation strategies. This included monthly reviews between business units and central operations teams and adaptive inventory segmentation policies.

The competitive landscape and customer replenishment needs defined the customer-segmentation strategies. While they have actively worked on the implementation of a cost-to-serve analysis, Kehat's feedback is "*Getting management buy-in for the implementation of cost-to-serve process is easy, but the implementation is difficult.*" Where they have had the most success is in the design of inventory strategies to buffer segmented demand and supply streams based on an understanding of the customer.

The evolution was incremental and includes the design of products to enable postponement based on five principles:

1. Postpone inventory while meeting customer service level requirements.
2. Delay product differentiation without adding significant cycle time or cost.
3. Reduce cycle time without compromising flexibility.
4. Understand, measure and design buffers to reduce variability.
5. Implement customer-centric policies to maximize \$/GB shipped while effectively balancing service levels and inventory levels.

Does it work? The *Supply Chains to Admire* report analysis, as shown in Table 1, illustrates that while SanDisk is driving significant improvement they are not the B2B leader. This honor goes to Cisco Systems, EMC, and Western Digital. So, why did I ask SanDisk to present? The answer is simple: it is a story of improvement. Both improvement and performance define supply chain excellence.

Table 1. Sandisk's Performance within the B2B Technology Sector

Performance and Improvement: B2B Technology																	
Company	Growth			Operating Margin			Inventory Turns			Return on Invested Capital			Revenue/Employee (K\$)		Supply Chain Index Rankings*		
	2006-2014	2009-2014	2011-2014	2006-2014	2009-2014	2011-2014	2006-2014	2009-2014	2011-2014	2006-2014	2009-2014	2011-2014	2006-2014	2009-2014	2011-2014	2006-2014	2009-2014
Adtran	0.03	0.05	0.02	0.18	0.16	0.13	9	8	7	14%	13%	10%	328	342	344	13	13
Alcatel Lucent	0.04	-0.05	-0.04	-0.09	-0.04	-0.04	7	7	7	-11%	-7%	-8%	273	271	272	7	14
Belden	0.09	0.04	0.1	0.05	0.07	0.08	9	10	10	3%	6%	7%	271	261	279	4	6
Cisco Systems	0.08	0.03	0.04	0.22	0.21	0.21	29	31	30	14%	12%	12%	629	624	648	11	10
EMC	0.11	0.09	0.10	0.14	0.16	0.17	18	19	20	9%	9%	10%	373	369	379	3	8
Emerson Electric	0.04	0.00	0.04	0.16	0.16	0.18	11	11	12	15%	14%	14%	168	168	178	6	6
Eriqsson	0.06	0.02	0.05	0.09	0.06	0.07	8	8	8	8%	5%	6%	352	324	320	13	1
HP	0.03	-0.01	-0.03	0.06	0.05	0.03	17	18	18	9%	6%	3%	435	367	359	12	12
NCR	0.04	0.04	0.09	0.06	0.06	0.08	7	7	8	11%	8%	9%	215	224	229	2	5
Qualcomm	0.20	0.17	0.25	0.31	0.29	0.30	23	21	21	13%	14%	15%	763	767	822	9	4
Sandisk	0.14	0.13	0.09	0.10	0.02	0.02	8	8	8	NA	NA	NA	1,292	1,250	1,272	1	2
Seagate	0.08	0.03	0.06	0.08	0.07	0.14	15	15	15	15%	14%	27%	226	236	252	5	15
Toshiba	0.03	-0.01	-0.01	0.02	0.02	0.04	8	7	7	1%	0%	3%	350	353	356	10	11
Western Digital	0.19	0.12	0.12	0.10	0.11	0.11	18	15	14	24%	17%	15%	181	268	167	15	8
Xerox	0.04	0.03	-0.02	0.07	0.08	0.07	18	20	21	5%	5%	6%	219	182	291	8	3
Average	0.08	0.05	0.06	0.10	0.10	0.11	14	14	14	9%	8%	9%	405	401	411	NA	NA

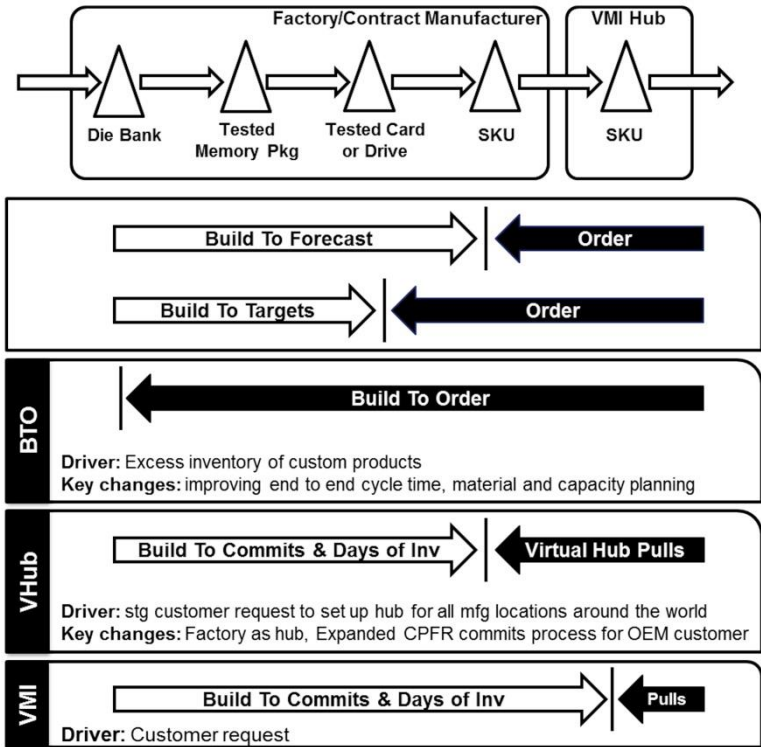
Supply Chain Insights LLC – Supply Chains to Admino 2015. Derived from YCharts, “Supply Chain Index Peak = Based on average ranking within industry of Balance (Return on Invested Capital & Revenue Growth Vector Trajectory), Strength (Inventory Turns & Operating Margin Trajectory) and Resiliency (Inventory Turns & Operating Margin Mean Distance). NOTE: ROLC data for Sandisk removed due to corporate redefinition.

I like what Kehat has accomplished in three areas:

1. **SanDisk Actually Uses Their Planning Technologies.** When I visited the SanDisk team, their use of supply chain technologies impressed me. While many companies purchase supply chain planning technologies, few use them actively. The SanDisk team has a very accomplished team using the technologies. They have abandoned their spreadsheet ghettos. The team understands the inadequacy of the spreadsheet to do supply chain modeling.
2. **There Is Active Focus to Close the Gap Between Commercial and Operating Teams.** The monthly meetings focused on the customer at SanDisk helps the planning teams to understand the customer. While many planning teams struggle to answer my questions, this was not the case at SanDisk. The teams engaged in enlightened dialogue on the drivers of the customer and the use of segmentation strategies.
3. **The Team Not Only Talks Customer Segmentation: They Act to Make It Happen.** The use of inventory postponement strategies and the design of buffers was the focus of Kehat's presentation. I love the detail and insights in Figure 2. This figure outlines the flows. This is a true execution of a customer segmentation strategy.

I like Kehat's story. One thing is for sure, the Supply Chain Insights' focus is never about platitudes.

Figure 2. SanDisk's Flows and Drivers



Source: SanDisk 2015 (Presented at Supply Chain Insights Global Summit, September 2015)

SECTION 2

Making the Digital Pivot

Ball and Chain

Recently I spoke on the evolution of the digital supply chains and my vision for Supply Chain 2020 at the World Trade Group Event in Miami. I was the last speaker at the event. There were many cancellations in the program and, as a result, I questioned why I had come. However, it turned out okay. The audience stayed for the presentation, and following the event there were many spirited debates at the restaurant bar on the content. I had touched some nerves with my five predictions for 2020:

1. **Digital, Outside-in Value Networks.** We are beginning to design and implement outside-in processes which will fuel growth agendas. These will be the foundation of digital supply chain thinking and will redefine business in the next decade.

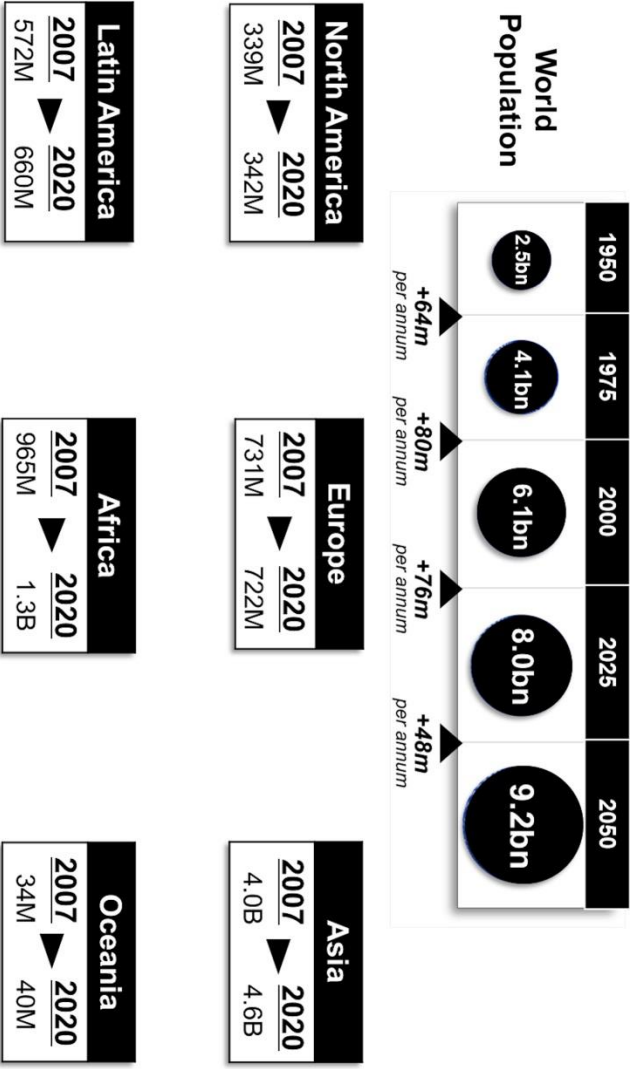
2. **Learning Systems.** Technologies are changing. In five years I believe we will have supply chain planning systems that learn while we sleep.
3. **Network of Networks.** Leaders will work with technology innovators to build the Network of Networks, ensuring interoperability between networks.
4. **Master Data Is No Longer a Barrier.** Cognitive learning and rules-based ontologies will redefine master data management technologies making them obsolete.
5. **Redefinition of Talent.** Dealing with the talent shortage in emerging economies will redefine human resource policies and industry consortia programs.

I believe the demographic shifts shown in Figure 1 will transform Supply Chain 2020. I also believe that growth in Asia and Africa will spur new thinking in supply chain processes for the use of mobility and sensor data.

While the companies in the post event discussions liked the predictions and were ready to take the jump, they struggled on the how. My take-away? It is hard to jump when shackled with a ball and chain. How so? Let me explain.

Let's start with a definition. A ball and chain is a restraint placed on a prisoner's leg to prevent flight. Used from the 17th century until the late mid-20th century, a ball and chain found in 2009 in the United Kingdom from the 17th century was an 18 pound ball, six inches in diameter. A 35-inch chain connected it to the prisoner's leg.

Figure 1. Supply Chain 2020



Source: "The World at Six Billion" United Nations, 2004; "The World UN Population Assessment 2006: "Unsustainable World," 04/15/08, BBC

Making the Leap to the Digital Supply Chain



2020 is four years away. It is just around the corner. The clock will move quickly. There are some positives: in 2016, over 60% of supply chain leaders are embracing cloud-based solutions, and 45% are increasing their spend in supply chain management solutions. So, why am I worried and writing a post about a ball and chain? There are three reasons or barriers:

A Singular Focus on ERP

As you can see in Figure 2, today ERP programs are consuming most companies. While I believe that an ERP program ensures a global system of record for transactions, I do not believe it is the backbone for the digital, outside-in supply chain. ERP is inside-out. By definition, it is not outside-in. Instead, the data model is inside-out. The goal of ERP is enterprise automation. Canonical networks, based on many-to-many data models, will be the backbone of future value network interactions.

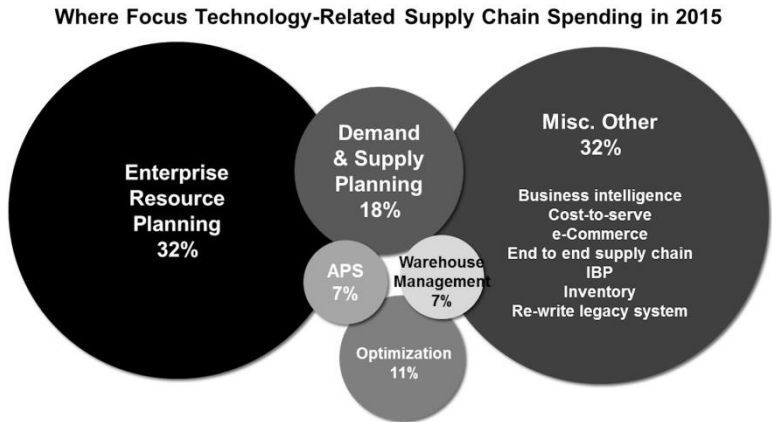
***My recommendation:** Implement ERP well the first time and recognize that it is essential for enterprise efficiency, but that it is*

not the backbone for value networks or the digital pivot. Try to free up resources that worked on ERP to embrace new forms of analytics.

The Most Efficient Supply Chain Is Not the Most Effective.

Within manufacturing companies with business process outsourcing, as the number of supply chain leaders decreased, power shifted to financial teams.

Figure 2. Focus of Spending in 2015



Source: Supply Chain Insights LLC, Supply Chain Leaders Speak Study (Jan-Sep 2015)
Base: Manufacturers, Retailers, Distributors – Answered question (n=28 – CAUTION: SMALL BASE SIZE)
24B. Where do you expect your company will focus its technology-related supply chain spending in 2015? Please write in your answer below. OPEN-ENDED

There is continuous pressure on costs. The singular pressure on costs can throw the supply chain out of balance and cause many companies to forget that the most efficient supply chain (with the lowest cost per case) is seldom the most effective supply chain. Why?

The issue is that costs need to be continually balanced with customer service, and inventory programs, against a business strategy. If the supply chain has high volumes and

high demand volatility (like vaccines, suntan lotion, bathing suits, seasonal foods), creating an efficient supply chain with the lowest cost, and reducing costs in continuous improvement programs without attention to the balance with customer service and inventory, is detrimental.

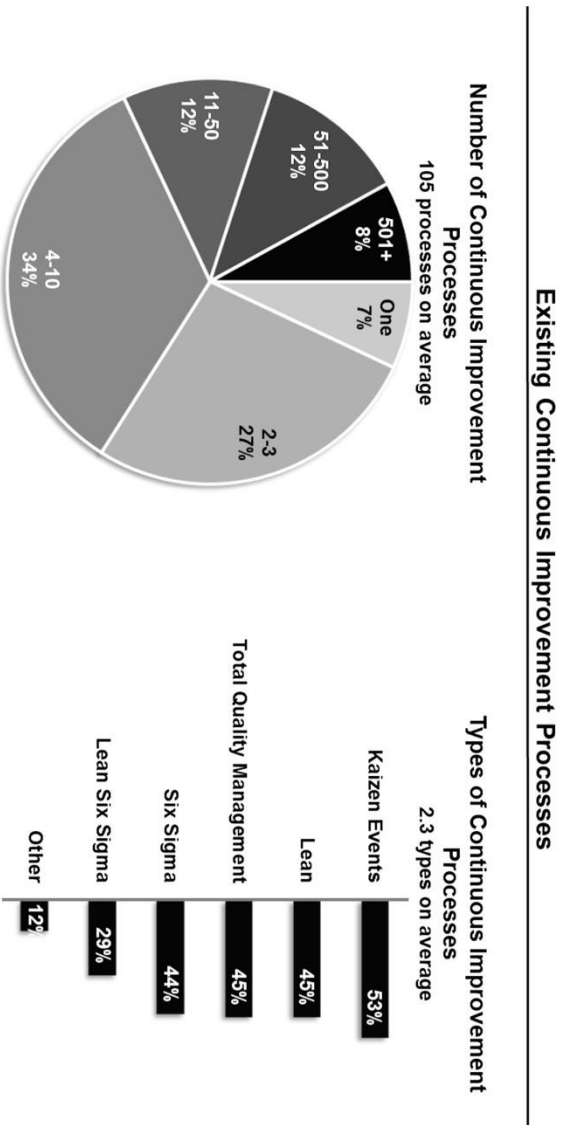
As shown in Figure 3, most companies have over 100 continuous improvement programs operating simultaneously; and with this many programs operating simultaneously, most companies struggle to balance cost, customer service, and inventory against the strategy.

Getting there requires support by finance and a clear cross-functional understanding of supply chain management.

Guide the discussion from cost to value. Then start to map outside-in processes and embrace the confluence of technologies to accelerate your journey.

Recommendation: *Be very clear on supply chain strategy and what is needed to drive success in customer service. Do not cut cost for the sake of cutting cost. Instead, try to focus the organization on cutting cost while driving a balanced metrics portfolio that includes inventory turns, customer service targets, Return on Invested Capital and growth. Use the funds from continuous improvement programs to self-fund digital programs. With IT budgets strapped with continuous upgrades of licensed systems, the self-funding of digital programs—cloud based software, sensors, new forms of analytics, visibility networks—may be the only way to stimulate the movement from inside-out to outside-in processes.*

Figure 3. Continuous Improvement Programs



Source: Supply Chain Insights LLC. Continuous Improvement Study (July 2015)
 Base: Manufacturers, Retailers, Wholesalers / Distributors / Co-Operatives Familiar with Continuous Improvement Processes at Company – Total (n=100)
 Q4: How many different Continuous Improvement processes is your company currently working on? Your best estimate is fine. NUMERIC RESPONSE
 Q6: What specific Continuous Improvement process(es) is your company currently working on? Please select all that apply.

We Have Best Practices.

Many traditional supply chain leaders believe that if we just continue to invest in continuously improving traditional processes, that progress can happen and the processes can become outside-in. What many do not realize is building digital processes and defining outside-in processes is a step change, not an evolution. (For more on this topic, reference my blogs on the building of the digital supply chain.)

Nine out of ten supply chains are stuck: the companies are unable to make improvement at the intersection of operating margins and inventory turns. It is time to make a change.

To make the leap we must change paradigms, invest in new technologies, and drive a process redefinition. I find this exciting, but it is hard to make the jump with the ball and chain of legacy thinking and investments. What do you think? How do you think that we build the digital supply chain and power outside-in processes?

Building Digital Processes

Social. Mobile. Sensors. 3D printing. The Internet of Things. The list goes on and on. The atoms and electrons of the supply chain are changing. My mind is spinning with the possibilities. Transmitted perfectly, replicated indefinitely; and with a one-time investment in network infrastructure, a digital task performs well with zero marginal cost. As a result, new data types move quicker and more accurately, with lower levels of investment.

I am passionate about the topic of the digital supply chain, and I apologize in advance for the length of this article. To enjoy the spirit of this post, get a cup of coffee, and curl up on a couch with your tablet and let your mind imagine the future.

Reflections

The third Supply Chain Insights Global Summit is over. We are starting to plan for next year. It is an agenda designed by supply chain leaders for supply chain leaders. The conference is always a lot of fun.

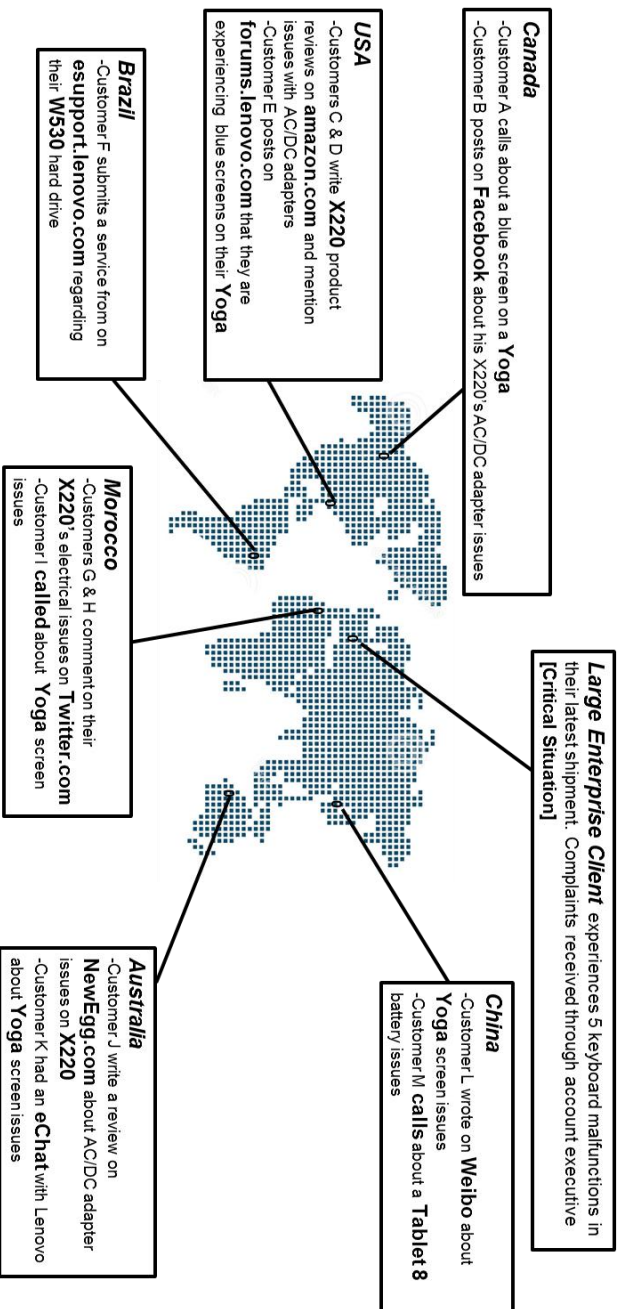
At the conference I encouraged the attendees to network with each other, to build a guiding coalition, to redesign supply chain processes for the Supply Chain of 2025. To deliver on the promise requires a guiding coalition of thought leaders. Building the inertia is my goal.

For the supply chain leader tackling the digital supply chain, the clock will tick quickly, but progress will happen slowly through deliberate actions. On the journey for the supply chain leader, time is irony personified. It is so much work to make small incremental improvements. The question on leaders' minds is, "How do I make the most improvement?"

As the conference agenda wound to a close, I stood alone on the stage thinking about outside-in processes to make the digital pivot. I feel strongly that it needs to happen. Why? Stuck on a performance plateau, supply chain leaders are unsure what to do. As shown in the 2015 Supply Chains to Admire report, over time, top performing supply chains plateau. As a result, companies like AstraZeneca, BASF, Colgate, Reckitt Benckiser, Seagate, and Taiwan Semiconductor outperformed their peer group in the period of 2006-2014, but sustained improvement becomes more and more difficult.

As supply chain improvement plateaus, it requires a re-thinking of processes to get to the next level. I think the answer is an investment in digital processes.

Figure 1. Lenovo's Use of Customer Sentiment Data

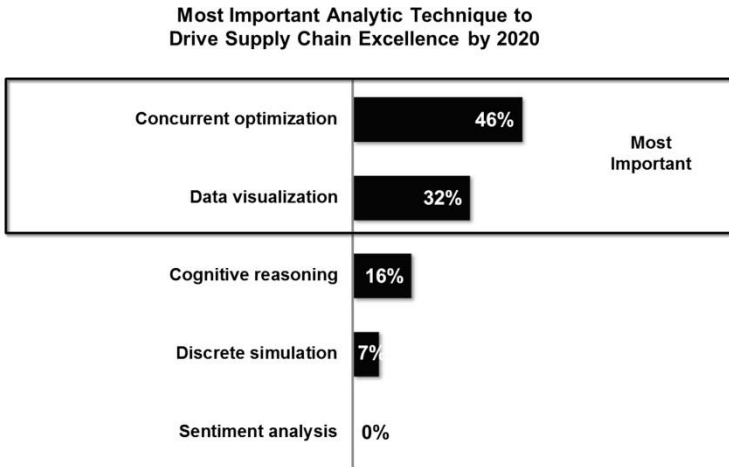


Source: Lenovo 2015 (Presented at Supply Chain Insights Global Summit, September 2015)

How Do We Make Progress in This Overhyped World?

There is tension. Navigating corporate politics is an ongoing challenge for the supply chain leader. At the conference the remarks of Anthony Volpe from Lenovo struck a chord. He spoke on the use of global sentiment data to sense and improve customer experiences. In his opening he remarked on an interview with his board. He reflected on his emotions when his CEO threw down a Harvard Business Review article on Big Data and customer-centric sentiment/social information and asked Anthony how he was going to do it.

Figure 2. Current State of Use of Sentiment Data in Supply Chain Processes



Source: Supply Chain Insights LLC, Global Summit Survey 2015 (August 2015)
 Base: Supply Chain Insights Global Summit 2015 Registrants (n=57)
 Q2015B. Which ONE of the following analytic techniques do you think is the most important to drive supply chain excellence by 2020?

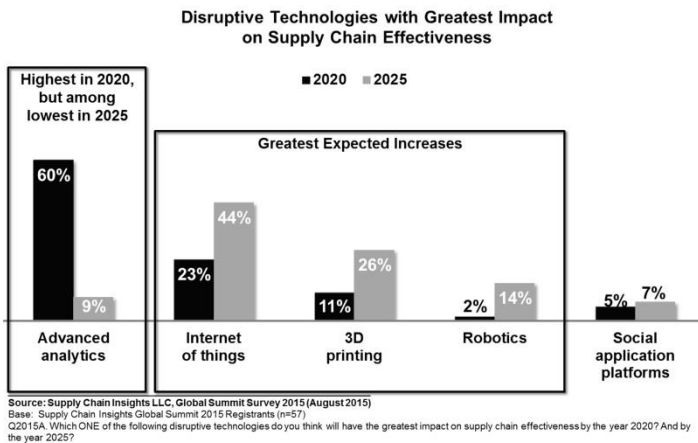
The problem is that we, as supply chain professionals, are often at the intersection of overhyped big ideas by consultants/press and the reality of today's processes. The use of social data in supply chain processes is just beginning. It is one

form of digital data. Reality? *We want to use social data; but, we do not know how. There is no place to put social data in today's supply chain processes.* However, the overhyped perception by many executives is different. *Executives believe it should be easy. It is not.*

Anthony's challenge? *We easily navigate the digital world in our personal lives, but enterprise software is not digital. There is no place to put the data. This is the unfortunate reality of the journey for the supply chain leader trying to make the digital pivot.*

I am beginning to understand how to use sentiment data and new forms of analytics. Process adoption into enterprise cross-functional listening processes will evolve in the next five years. As shown in Figure 3, as companies make the digital pivot, the period of 2015-2020 will be about analytics. However, the period of 2020-2025 will build on a confluence of disruptive digital technologies to drive new process innovation.

Figure 3. Confluence of Disruptive Technologies on Supply Chain Processes



Making the digital pivot will embrace all of these disruptions together to drive innovation and define new business models.

The confluence will drive the evolution of digital outside-in processes.

Why Do We Need Digital Processes in Supply Chain?

While e-commerce was the driver of growth for Retail and Consumer Products in the last decade, digital transformation is the driver for the next decade. To better understand this, let's more closely examine seven facts:

1. **Companies Want Adaptive Systems.** Today's supply chain processes respond. They do not sense. Because they cannot sense, they do not adapt. Global markets are both concentrated and dispersed. They are dynamic. Without sensing, and market-driven outside-in processes, the organization is out of step with the markets they serve.
2. **The Supply Chain Is a Nonlinear Complex Adaptive System That We Are Modeling Using Linear Optimization.** The first and second generation of supply chain technologies used linear optimization. Based on technological capabilities at the time, it was all that we could do. However, today we know the supply chain is a complex system with nonlinear relationships. The good news is that the new forms of prescriptive and cognitive analytics help to model nonlinear relationships. The bad news is that they are new and evolving requiring co-development. New forms of analytics—cognitive computing, artificial intelligence, rules-based ontologies, pattern recognition, combinatorial math—promise new answers. The use of these new forms of analytics, in combination

with relational and non-relational database architectures, offers new opportunities.

3. **Customer Data Has Never Been More Available. There Is a Gap in Our Ability to Use It.** With the evolution of social, mobile, and web-based technologies, customer data has never been more available. We want customer-centric supply chains. The irony is that we are unable to use it. The use of unstructured and semi-structured customer data requires new techniques and processes.
4. **Digital Data Moves Quickly at the Cadence of Business. Enterprise Systems Move Slowly at the Speed of Transactions.** Our current enterprise solutions are slow and inflexible. They cannot move at the cadence of business. The world has become digital. Supply has not. We are out of sync with the digital world.
5. **Inside-Out versus Outside-In.** The traditional supply chain depends on orders and shipments. Both signals have data latency (out of sync with the market) and accelerate the Bullwhip Effect. MRP and DRP logic uses order and shipment data permeating the Bullwhip Effect. The movement to outside-in processes has the potential to reduce waste and prevent the distortion of signals between nodes in a value network.
6. **CRM and SRM Are Not the Adapters to Build the End-to-End Value Chain.** Customer relationship management (CRM) and supplier relationship management (SRM) are enterprise applications. They are not suitable connectors for B2B networks. The

connections to B2B networks need to be based on trading partner synchronization and harmonization of data through the use of canonical infrastructures.

7. **Opportunity with New Technologies and Approaches.** Last, but not least, and probably the most important point, is the opportunity through the use of new technologies and rethinking processes based on new thinking. It just makes sense to align the supply chain with the speed of business based on the voice of the customer.

Step 1: Redefine the First-Order Design Principle for Supply Chain Decision Support Technologies.

A software developer starts with first-order design principles in the building of code. The first-order logic of a digital process is dramatically different from the traditional assumptions of today's systems. As a result, outside-in software is not an extension of the traditional inside-out optimization from the first and second rounds of software evolution.

Today, supply chain software leaders struggle with the Innovator's Dilemma. In 1997 Clayton Christensen explained the tension in his book. In the face of disruption, this dilemma is deadly. What happens? Successful companies put too much emphasis on the stated customer's needs and fail to adopt new technologies or business needs. They miss the new market opportunity. It is illogical, but important. Eastman Kodak failed to make the digital pivot, and many software providers will fail as well.

In supply chain the Innovator's Dilemma is alive and well. Supply chain software providers are struggling. Traditional commercial models focus on maintenance upgrade cycles and refinements of existing software. Business leaders do not

know how to define digital outside-in processes. The inertia is incremental improvements to existing software. What needs to happen is a redefinition. It is a tough transition. However, it will define a new set of winners and losers.

Step 2: Define the Moments of Truth and Build Test-and-Learn Strategies.

For most companies the traditional focus is on the management of order to cash, procure to pay, and forecast to deliver processes. As companies build digital processes, the moments of truth in the supply chain change. This enables the automation of test-and-learn strategies to flex and adapt at the moments of truth. In this blog post, I will apply this methodology and discuss the potential redefinition of three digital processes: Digital Manufacturing, Digital Path-to-Purchase, and Digital Agriculture. I could have picked a myriad of processes, but I am going to focus on these three to illustrate the points.

What is a moment of truth? It is an inflection point and a measurement of success. When companies do well at the moment of truth there is success. Meeting the goal of the moment of truth is black and white. At each moment of truth the supply chain either delivered, or it didn't. For example, was the product on the shelf in the digital path-to-purchase process when the consumer was in the store? Or did the machine fail in the digital manufacturing process? Another example: was the product delivered on the delivery date? In the definition of corporate social responsibility we must also embrace disposal. Was the product disposed of in a way that meets corporate social responsibility objectives? The moments of truth for digital processes are outlined in Table 1.

Table 1. Moments of Truth

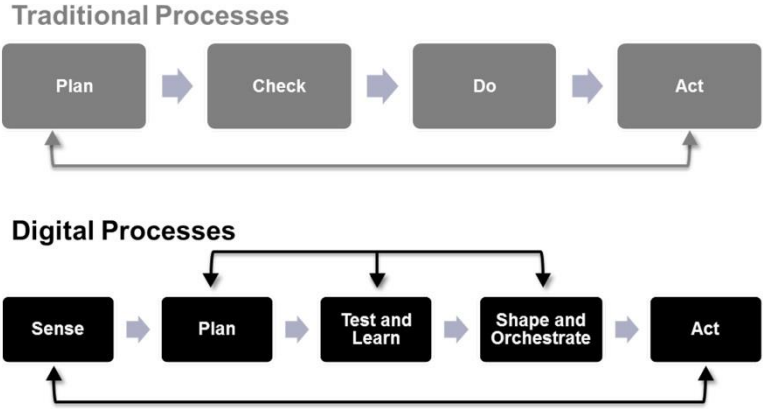
Moments of Truth

Digital Process	First	Second	Third	Fourth	Fifth	Sixth	Seventh
Digital Path to Purchase	List	Shelf	Basket	Purchase	Experience	Disposal	
E-Commerce	Catalog	Click	Basket	Purchase	Receipt	Experience	Disposal
Digital Transportation	Tender	Acceptance	Delivery	Payment	Route		
Digital Agriculture	Plant	Harvest	Package	Experience	Disposal	Next Season	
Digital Manufacturing	Schedule Use	Sensing Wear	Failure	Repair	Sensing Wear		

In addition, in the development and rethinking of these first-order processes, through the use of cognitive and prescriptive analytics, we have the opportunity to build test and learn processes. This can be continuous through the design of process hypothesis and continual test-and-learn strategies. Examples are:

- **Retail Category Management.** Was the assortment optimal for a market? Do test stores perform better than control stores?
- **Digital Agriculture.** Did the combination of seed and crop protection methods increase yield? How does it compare to test plantings?
- **Digital Manufacturing.** What improves the life of equipment? What conditions improves uptime? How can we schedule based on actual production capabilities?
- **e-commerce.** What drives a consumer to put an item in their basket on e-commerce sites? How can we improve baskets that are abandoned?
- **New Product Sensing.** Which markets responded best to a new product launch? What is the best combination of package and price to drive sales?

Figure 4. Contrast of First-Order Thinking in Digital Processes

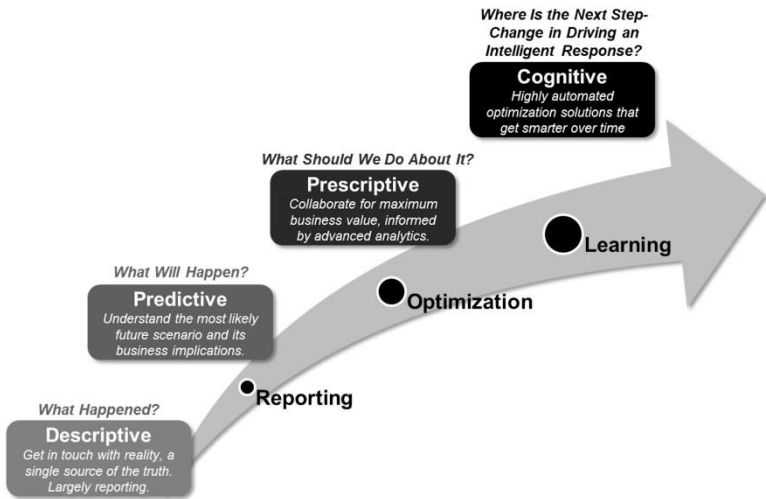


Step 3: Embrace New Forms of Data.

Digital outside-in processes use structured, unstructured, and semi-structured data. Historically we have lived in the world of structured data. We are just starting to envision a supply chain world that embraces the variety of data types. The redefinition reshapes our paradigms.

Fueled by structured data analysis, decision support tools today focus on optimization. However, as we embrace data variety the architectures need to embrace structured and unstructured data forms. This transition moves companies up the analytics maturity model shown in Figure 5 to embrace prescriptive and cognitive analytics.

Figure 5. Analytics Maturity



Step 4: Use the Power of New Technologies and Computing

The limitations of client-server or early hosting platforms held us back in the design of supply chain planning systems in the 1990s. As we harness the power of parallel processing in the cloud, we open up new opportunities of what is possible.

To envision the supply chain of the future, spend time to learn new concepts. Explore and understand the opportunities of non-relational databases, streaming data architectures, rules-based ontologies, cognitive learning, and new forms of sensors.

Step 5: Map the Processes Outside-in. Throw Away Old Paradigms.

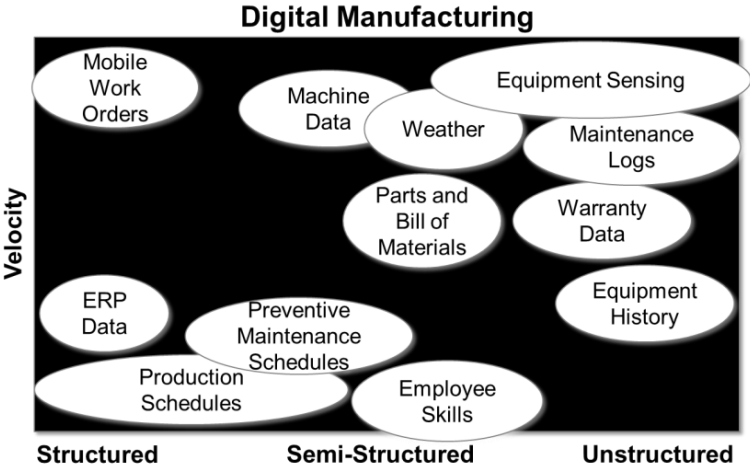
Start with a whiteboard. List the moments of truth and then brainstorm the data elements that can help to define the process analytics to improve the outcomes at the moments of

truth. In the frameworks below, I share three example outputs from workshops that I completed.

Digital Manufacturing. The typical manufacturing floor has many sensors and programmable logic controllers operating in isolation. What if these sensors could be read in real-time with the signals converted into production schedules? This is the definition of digital manufacturing.

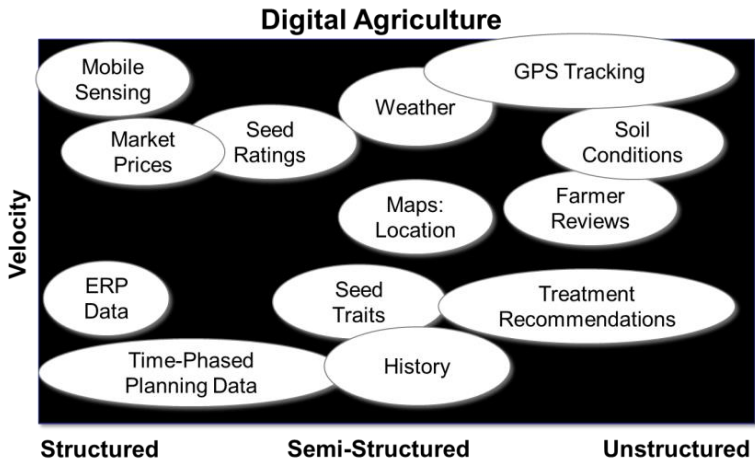
Digital manufacturing continuously senses machine conditions and schedules maintenance schedules based on actual machine conditions. This is replacement of maintenance schedules based on mean-time failures. The benefit is greater reliability and increased productivity.

Figure 6. Digital Manufacturing Data Types



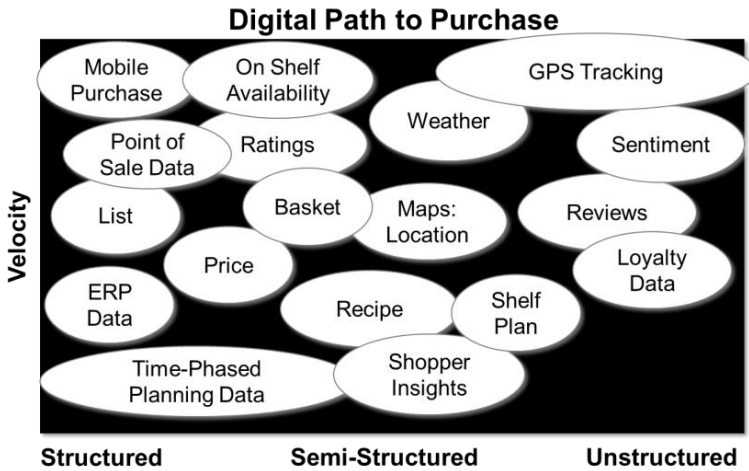
Digital Agriculture. Digital agriculture is the use of digital signals to improve yield and profitability of the farmer's field. The use of unstructured data along with traditional structured data will enable new service models. Monsanto's new investments in weather sensing are consistent with this vision.

Figure 7. Digital Agriculture Data Types



Digital Path-to-Purchase. The definition of digital path-to-purchase is the use of digital technologies to automate the generation of the list, the replenishment of the shelf, the analysis of the basket, the use of checkout data (point-of-sale and loyalty information), and sensing customer sentiment to better serve the shopper. Today, 5% of consumer products manufacturers have a digital path-to-purchase initiative.

Figure 8. Digital Path-to-Purchase Data Types



I could go on and on, but I will stop. As you can see, I find digital supply chain processes exciting. If you do too, visit with your digital marketing team and start brainstorming. If you would like to brainstorm with supply chain leaders, join our Shaman Circle calls. These are monthly calls with supply chain leaders on specific topics like visibility and analytics. (And, you can join for free.) Just let us know!

These are my thoughts on this crisp fall day. I would love to hear from you!

Embrace New Ways of Working

Tomorrow, I am off to Europe. On Thursday I speak on the future of supply chain technologies at an EyeOn conference in Rotterdam. It is the end of the fall conference speaking circuit and I am looking forward to spending time at home over the holidays. While I love talking to supply chain professionals at conferences, and challenging them to think more holistically about supply chain excellence, as the leaves fall I yearn for my home. In my roots I am a homebody. I like winter by a fire.

Last week I visited a local supply chain team and spoke on Supply Chain 2020. It was open microphone with a group of 30 young professionals. I like talking to young professionals. One of the questions asked was, "What do you believe the

impact of social technologies on supply chain will be in 2020." I smiled and took a deep breath. It is one of my favorite questions. I had a fire in my belly for this answer.

I spoke of Anthony Volpe's presentation on sentiment analysis at our recent Supply Chain Insights Global Summit. As I spoke, I asked "*Who knows what sentiment analysis is?*" No one raised their hand. I find very few supply chain professionals understand the promise of mining unstructured text to listen to customer sentiment. In the workshop we talked at length about the use of sentiment analysis to sense quality issues, market opportunities, and new product launch acceptance. I shared how sentiment analysis enables companies to sense product quality issues four to six weeks before knowledge by a traditional call center. It would have helped GM to pinpoint the ignition issue and Kellogg to detect the smelly packaging problem faster.

The conversation then spilled over to the use of Twitter as a customer service channel. I spoke of my experience during the Icelandic ash issue. Twitter enabled me to get to Europe on one of the few available seats. By listening to the hashtag on the #ashcloud, I got up-to-date information on which planes were flying to Europe. There was no latency. The information allowed me to position myself early in a customer service line in a short window of time when the ash particulate subsided and flights quickly resumed for six hours.

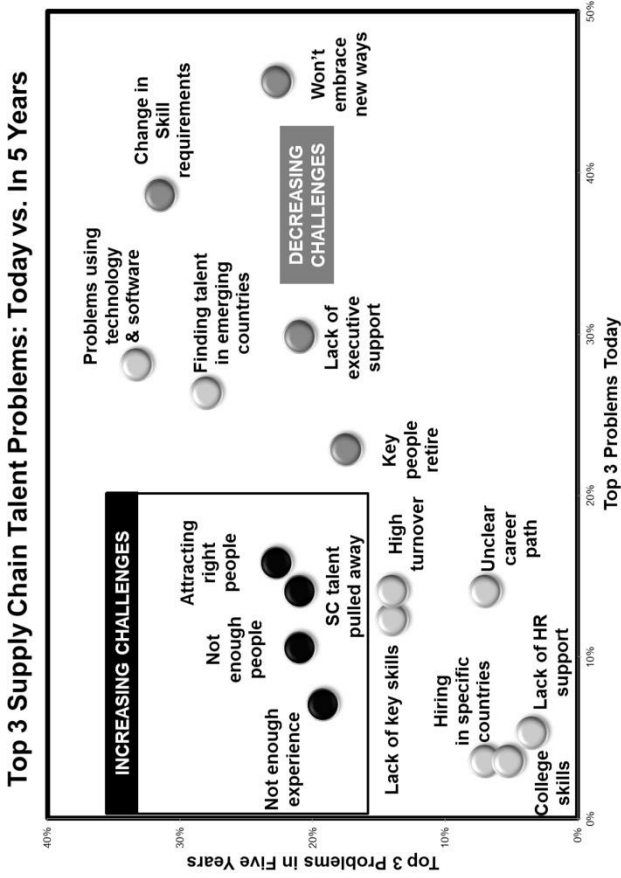
As we brainstormed the opportunities for the people in the room to use social in supply chain processes—LinkedIn and Twitter in their jobs—one of the older managers attending the session interrupted and said, "*Remember, the information must be accurate.*" I smiled and let the comment go and continued the brainstorming. The older manager interrupted

again, and said, "*Remember that the information must be accurate.*" I smiled and changed the subject.

It is amazing to me that supply chain leaders are willing to accept the data churning out of their spreadsheet ghettos as accurate, but are unwilling to believe/listen to social sentiment because they think the data is inaccurate. I often scratch my head. It does not match my experience. I firmly believe that if a customer cares enough to Tweet a concern, complaint, or a recommendation, that the provider of the service is well-served by listening. I find Twitter an accurate source of data.

One of the major problems is that most organizations do not know how to listen. Social sentiment and the use of social data as a listening post is a foreign concept. As we continued, the dialogue reminded me of a greater issue. My mind wandered to the chart shown in Figure 1. One of our greatest challenges in managing supply chain talent is embracing new ways of working. I see it every day. We believe that the data within the organization is accurate and we have best practices that are driven like wildfire throughout divisions and businesses. I, on the other hand, believe that most of the data within our organizations is highly inaccurate with an undesirable level of latency. I also believe that we have evolving practices which can only get better if we throw them on their side and redesign them so that they are outside-in (from the customer back) versus inside-out (from the order in). Inside-out processes focused on enterprise efficiency limit our ability to build value networks and drive waste and cost out of the extended supply chain. However, to seize this opportunity we need to embrace "new ways of working."

Figure 1. Issues with Supply Chain Talent: Today versus Future Five Years



Source: Supply Chain Insights LLC, Global Summit Survey 2015 (August 2015)
 Base: Supply Chain Insights Global Summit 2015 Registrants (n=57)
 Q2015C. Which are the top 3 issues facing companies today when it comes to supply chain talent? And what do you think will be the top 3 issues in five years (2020)?

This week, when I am in the Amsterdam airport trying to get home, I will have my mobile phone in my hand. If there is a problem I will not call the Delta support line; instead, I will Tweet to get information. The difference in response time is 5-10 minutes. By Tweeting I will not be placed on hold, and the information will accurate and timely. I am a road warrior. Road warriors have no patience for long lines, calls placed on hold, or slow answers.

I believe that Twitter is a wonderful means to listen to customer sentiment--valuable information on true usage and product acceptance. I also believe that it is an opportunity for many to have a direct line to their customer to help in times of need. What do you think?

Welcome the Iconoclast

Iconoclast: *i·con·o·clast - i'känə, klast - noun*
A person who attacks cherished beliefs or institutions.



Writing—the process of words flowing from the mind to the fingers—is fascinating to experience. I write at least 3,000 words a day for various publications. Sometimes the words flow fast and furiously, and my arthritic fingers struggle to keep pace; while at other times, like last week, the thoughts don't flow at all. There is a block that I don't understand. In the times of drought, when words do not flow,

the item on my to-do list—*write my Shaman blog post*—does not get fulfilled. This has been the case for the last week. Writing the blog post sits on my notebook list day after day and I cannot cross it off. For this, I apologize to my readers. It is tough to force writing when the words don't want to flow.

As a child I never fashioned myself as a writer, and the concept of blogging is still quite new to me. I have been a blogger for six years. At times it is uncomfortable. I am an iconoclast. I did not set out to see the world differently. It just happened.

As a writer you feel quite naked questioning the status quo. Sometimes you receive hate mail. There is tension. The supply chain technology market is quite lucrative for sales and marketing at technology firms; and when I take a hard stance in the market (which the readers tend to love and the technology vendors tend to hate), the vehement reaction from the vendors amazes me. It is uncomfortable. I struggle. My inner child wants to be liked. It is hard to take a tough stance. For example, this was in my email last week, "*our experience in working with you is not the best and every time we want to re-engage with you, you write a damaging report about our offering (which in my mind is never based on facts but always based on personal opinion).*" In the market, complaints against this vendor's solution run high by the business buyer, but the solution is well-accepted by the IT buyer. However, this is not the world view of the vendor's organization.

I strive to make this blog independent. I tell it as I see it; yet, I realize that all people see things differently. My words are never influenced by commercial relationships. I do not write for money; and as a result, in the blog there is no adver-

tising or advocacy for any technology vendor in my writing. When I feel pressure from a vendor to change a stance, I remind myself that I write for the line-of-business buyer. When challenged, I search for facts and I continually push back my uncomfortable emotions to ask myself, *“What do I need to say in this blog to help the supply chain leader? I try to stay focused on my purpose of helping the supply chain leader make a difference.”* In these cases I must use the vendor feedback as input, and constantly ask myself this question. I am much freer to write things as I see it now—as the owner of a small company—than I was when I worked as an analyst for a larger company like Gartner or AMR Research.

In the writing I attempt to use myself as an instrument. The writing is a reflection of my collective experiences—speaking, sharing research, doing research projects—with supply chain leaders. It is quite different from consulting. How so? By definition, the work is data driven, and I am able to experience more input as an analyst through a greater variety of experiences than if I was a consultant. (The more that I am in the market listening/experiencing the business pain, the easier the words flow.) In the process I also try to make my writing authentic, and a reflection of my continuous learning. In my evolution as a writer I also continually work on developing a voice, and a distinctive style. I hate buzzwords and love deep learning. I try to have fun. For the words to flow, my collective experiences must reach a tipping point. This is the case today. My coffee pot is on, blueberry muffins are in the oven, and words are flowing freely from my fingers between client calls.

Embrace the Iconoclast in the Data-Driven Organization

Last week on my Shaman's Circle call I had 14 companies participate in a discussion on the adoption of emerging forms of supply chain analytics. It is a popular topic. Supply chain leaders are swimming in data and they want insights. New solutions are proliferating; yet, companies try the same approaches. Leaders don't know how to fix the situation.

No company on the call felt that they had a data strategy. One company was testing a non-relational solution. While companies desire real-time systems and new insights, many were just trying to get the planning systems that they had now working better. On the call, no company thought they had cracked the code of delivering on the promise of supply chain analytics.

In this new world of analytics many paradigms shift. New norms emerge. This was the essence of the discussion. Here are seven steps that resonated within the group:

1. **Rethink the Project Definition.** While, historically, projects were based on the definition of process “to be states” and the mapping of the “as is” to the “to be” states, in a data-driven analytics world the implementation starts with the data. The data patterns drive the process definition. The projects are small and implemented by the line-of-business teams and the progress is ongoing. There is an unknown ROI. This flies in the face of the large IT implementation that has a well-defined outcome. In analytics projects, the savings and value proposition evolves over time. It is a test-and-learn environment.

2. **Embrace New Data Types.** New concepts shatter many other norms. The supply chain organization is hardwired to think about structured data, linear optimization and generating reports. The use of unstructured data—images, text, social, and weather—is new and the path forward to use unstructured data is not clear.
3. **Fall in Love with Black Boxes.** Similarly, the world of prescriptive and cognitive analytics is new. Linear programming and the use of traditional optimization techniques is comfortable. There is a general mistrust of “black boxes” and teams feel better when they “touch data.”
4. **Blow Up Excel Ghettos.** Despite spending 1.7% of revenue on enterprise technology, Excel spreadsheets abound. The supply chain is often run by groups in spreadsheet ghettos. In the words of a participant on the call last week, *“We have implemented SAP APO, but are stuck in intermediate Excel. How do I move past my current state?”*
5. **Stabilize ERP Investments.** New forms of supply chain analytics are largely cloud-based and are not dependent on ERP architectures. Think beyond traditional transactional approaches and embrace new forms of analytics. To get there—resources and money—you will need to stabilize ERP.
6. **Look and Build Beyond the Firewall.** An outside-in process requires the use of channel and supplier data. This data sharing typically requires a one-to-many or a many-to-many data model found in the emerging value-network technologies like GT Nexus, Elemica,

E2open, Exostar, GHX, SAP/Ariba, and SupplyOn. The problem is that these supply chain network operating models do not interoperate and there is no integration/synchronization with the networks of the 3PLs like CH Robinson or BDP International.

7. **Make Master Data Extinct.** The traditional organization is paralyzed by master data issues. I find it ironic that the manufacturer and distributor companies struggle with master data issues; yet, the companies with the largest databases are the most data-driven companies (the e-commerce pure plays have no master data issues. It stems from a different data strategy using Hadoop and cognitive learning versus tight integration and moving data.) In the words of one of the manufacturing participants on the call last week, *“How can we break with tradition and consider new forms of analytics when it is not an industry norm yet for our industry?”*

This is not an evolution. Through the use of new technologies we have a new way of approaching the problem.

Historically, companies have made a mistake of implementing supply chain analytics/planning technology as a technology project versus implementing technology to improve core capabilities. The two approaches are radically different. For example, I am currently working with a large organization implementing Kinaxis. Installed as a technology project two years ago, the technology works, but the project is a failure. Why? The organization did not build a planning organization to use the technology. Planning tools are no use unless you define how you will use the output to make better decisions. This evolution is especially hard in an organization

that has been largely reactive and focused on manufacturing. The same is true with analytics. Focus on driving business outcomes. There have never been more exciting alternatives.

Move at the pace of your business and embrace your company’s ability to test and learn with new technology. In Table 1, I share a road map to think about as your supply chain group thinks about analytics. It is a continuum of technologies based on the rate of adoption that a company is comfortable with.

Table 1. Adoption and Evolution

Area of Focus	Augmentation Strategies to Consider				
	Innovator	Early Adopter	Early Majority	Late Majority	Laggards
Building B2B Networks	Sensing Through Canonical Many-to-Many Models	Multi-Tier ATP	Control Tower: Supply Chain Execution Sensing	Transportation Networks	EDI
Supply Chain Planning	Cognitive Learning	Concurrent Planning	Demand-Sensing Cloud-Based Planning	Multi-Tier Inventory Optimization	Supply Planning
Channel Management	Digital Path to Purchase	Predictive Analytics on Channel Data	Demand Signal Repositories	VMI / CPFR	Order Management
Manufacturing	Digital Manufacturing	Predictive Quality Models	Digital Integration into Machining Predictive Maintenance	Integration of MES to Production Planning	Production Planning
Analytics	Rules-Based Ontologies	Sentiment Analysis	New Forms of Visualization	Telematics and Mapping	In-Memory Reporting

So, as you start to implement new forms of analytics, embrace the iconoclast in the group and form a scrappy team. Have the courage to attack building a data-driven organization through new thinking enabled by new technology. I hope this helps to get you started. Let me know your questions.

Insights on the Evolution of the Digital Supply Chain

This week I am busy packing. It is the same feeling that I had as a child getting ready for camp. For the next 18 weeks I will be in the air. I will be speaking and working with clients in wonderful locations in Brussels, China, Germany, London, Mexico, Peru, and South Africa. In the process I needed a visa for China, and I wandered into an old-fashioned photo shop to have my picture taken for the visa application.

I love photography, and mused as I walked into the shop on that rainy day in Philadelphia. I smiled when I saw that they still printed film the old-fashioned way. When I asked

the owner how long it would take to process the pictures for my visa she said, "*It will take a while. Probably three to five minutes. Why don't you go have lunch?*" I gave her a stare in disbelief. At one time a three to five minute response would be seen as immediate. I even remember when the overnight processing of film was considered quick. Now the expectation is immediate or real-time.

As I drank a cup of coffee and waited, I reflected on the article I had just completed for the Institute of Supply Management. At their request I wrote on the digital supply chain. I cringed when I got the assignment. Digital supply chain is such a buzzword. One of my friends in consulting markets the concept by a direct-mail campaign of mailing personal drones in special wrappers. When he told me I laughed and said, "*That is so lame! The digital supply chain is about SO much more than gadgets.*"

I hate buzzwords and try to sidestep hype, but as I held my mug tight in my hand on a cold Philadelphia day, I thought more about the photo shop experience. I reflected. Very little is the same within a photography store as compared to five years ago. No one waits for a picture. Yet, within the supply chain, everyone waits for data and insights. One of my clients waits four days for a custom report. At another client there are 80 ERP systems, and the supply chain team cannot see across instances. It is sad, but true.

Supply chains do not move in the cadence of the market. Leaders know that massive change in supply chain processes is coming but they do not know how to get started. This is the goal of this blog.

Reflection

Five years ago the buzz in marketing was rampant in the news and at conferences. The talk was all about digital marketing. Today marketing is just marketing. The term digital was dropped. The reason? Digital media and technologies were quickly absorbed into marketing processes and redefined the norm. Few companies speak of digital marketing now: it is just assumed.

In supply chain, leaders are just starting to think about digital. A frequent question from my clients is, “*What is a digital supply chain process?*” My answer is that a digital supply chain process uses new technologies to define processes to sense, respond and orchestrate bidirectionally from market to market (from the channel to supplier networks). The processes move at the cadence of the market. This is a very different definition than the traditional supply chain practices that are often touted as “*best practices.*” Supply chain practices are almost 35 years old, and they are slow to change.

Let’s start by examining the differences. I see five primary, but pervasive, shifts.

1. **Sensing.** Traditional supply chains do not sense. They respond. The response is usually based on history. Despite all of the investment in sensors—RFID, PLC(s), GPS, telematics—most are not used in day-to-day supply chain processes.
2. **Outside-In.** Historic processes are inside-out, rooted in transactions. Digital processes are outside-in, focused on market opportunity and risk. This requires the mapping and rethinking of supply chain processes. The digital supply chain transformation requires rethinking the basics.

3. **Cross-Functional and Horizontal.** In the past, supply chain processes were functional focused on make, source and deliver. The digital supply chain is cross-functional and aligned market-to-market. The flows are from the customer's customer to the supplier's supplier.
4. **Quick, Nimble and Responsive.** Traditionally, supply chain technologies are batch processes. As a result, analytics are usually based on historic data with outputs having a one- or two-day lag. The digital supply chain enables the use of market data at the cadence of the market. The supply chain no longer needs to be out of step with the shopper or the supplier.
5. **Network Response.** While the traditional supply chain focus is on the implementation of enterprise applications, the digital supply chain is outside-in, based on network sensing and adaptation. While the last decade focused on the automation of the enterprise, the next decade will focus on the digitization of the network.

How will it happen? What are the important digital technologies? There are many. The confluence of technology is the driver. It is not one technology; it is many. This includes 3D printing, robotics, the Internet of Things (IOT), Sentiment Analysis, Cognitive Learning, and Supply Chain Operating Networks using canonical many-to-many data models. While the initial focus is on analytics, in the next ten years digital processes will develop based on a confluence of technologies. It will not look the same everywhere. The processes will evolve based on the drivers within the value network.

In my speeches on the evolution of the digital supply chain, leaders ask me, “*How do I get started? What should I do as a leader to accelerate value?*”

My advice is to throw away any concepts of “*best practices*” and embrace “*new and emerging technologies.*” Traditional IT projects of three letter acronyms (ERP, APS, CRM, SRM) fueled the evolution of the current state. However, the adoption of digital processes requires rethinking of the project implementation as well. Let's examine the basics. In the traditional process design, the start of a project was the mapping of “as is” and “to be” processes. The next step was usually the implementation of a large project. In contrast, test-and-learn principles drive digital evolution. Start small, learn, and then evolve. The testing of digital processes is best leveraged by a small cross-functional team led by a line-of-business leader. Charter a scrappy team of diverse and talented people to challenge the status quo.

I encourage business leaders to self-fund their projects. How to do this in the face of severe cost-cutting pressures? Many of my clients save 5-10% of funds from their continuous improvement projects and self-fund their efforts. Gradually their teams evolve their understanding of what is possible.

The next step is education. The technologies, terms and process definitions are new. As shown in Table 1, most organizations think in the terms of transactional, or structured, data. The use of unstructured data is new and the analytics to mine and harvest unstructured data will take time to evolve. A good place to start is the mining of sentiment data from customer call centers, rating-and-review information, and social media.

Table 1. Characteristics of the Digital Evolution

Comparison

	Current State	Evolving Technologies
Data	Structured	Structured and unstructured
Rules	Simple rules: single “ifs” to single “thens”	Adaptive rules: multiple “ifs” to multiple “thens” through cognitive learning
Engines	Optimization based on a “known” function or mathematical outcome	Concurrent optimization, cognitive learning and combinatorial math to drive discovery and new insights
Deployment	Within the organization	Cloud-based to synchronize inter- and intra-enterprise flows
Process Flows	Inside-out with a focus on the efficient response	Outside-in with a focus on sensing and adaptation
Database Structures	Relational	Relational and non-relational to mine data in lakes, streams and clouds
Visualization	Rows, columns and graphs	Simulation and digital representation of outcomes

After mining the data, form cross-functional review groups to understand the true “voice of the customer.” At Dell, Lenovo and Whirlpool these are weekly meetings. Then start mapping the processes outside-in to capture the voice of the customer and power customer-centric processes.

Test and learn using new forms of visualization and pattern recognition. Look for cloud-based deployments that support a heterogeneous environment. Challenge the teams working with the data to give you one new insight a week. Build sensing capabilities: look for the trends that you do not know.

Over time, build capabilities for streaming data (the data infrastructure to support the Internet of Things), rules-based ontologies to support cognitive learning, and pattern recognition in network sensing. Take your time. These are new concepts. As you learn, brainstorm with the group to design new digital outside-in processes.

Ask yourself, “*Where is my opportunity? Is my opportunity in the area of digital manufacturing?*” (The use of Internet of Things and 3D printing to transform manufacturing.) *Digital logistics?* (The use of GPS, telematics, and cognitive learning to build logistics systems that sense and adapt.) *Digital sourcing?* (The use of new network technologies to sense and manage supplier relationships to ensure ethical and reliable sourcing.) *Digital path to purchase?*” (The automation of the moments of truth in the buying cycle to decrease demand latency and better sense shopper and consumer demand in real-time.) Start with the goal in mind and focus on the greatest value proposition.

Along the way, avoid hype. While consultants will come and talk to you about big data, and digital transformation, sidestep buzzwords. Make your transition real and powerful. No doubt about it, we are in the middle of change. However, the evolution of supply chain processes will take time. It is not an evolution. Digital supply chain processes are a re-definition. It is both promising and challenging. I believe that we are at the beginning of a 15-year evolution. Good luck with your journey. I hope to see you in my travels.

SECTION 3

Implementing Strong Horizontal Processes

Bridging the Sales and Operations Talent Gap

Today, I am in London fighting jet lag. In between nights of fitful sleep, I am working on a new report for our newsletter this week. The report summarizes insights from 28 quantitative research studies.

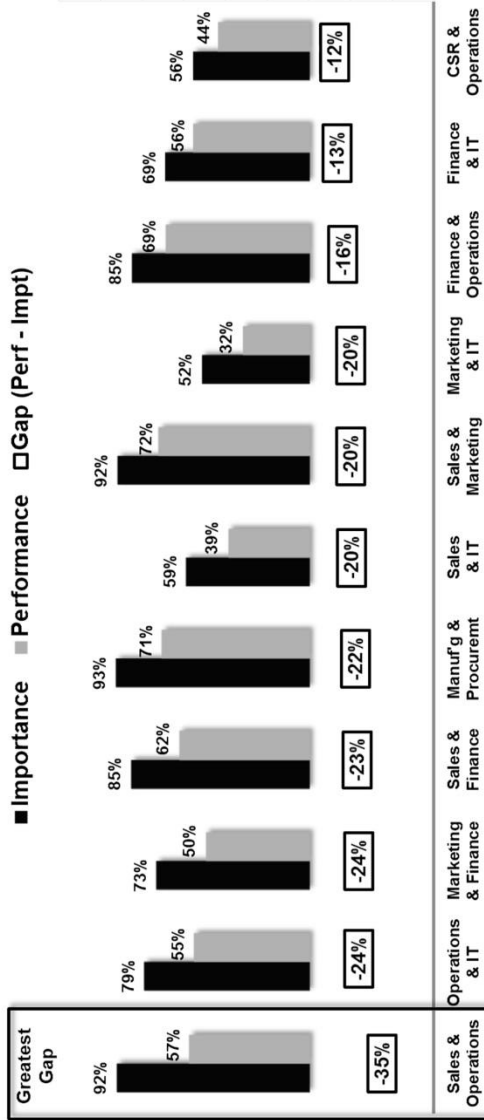
As a supply chain geek, I am always trying to understand supply chain trends. You will find me sitting at my desk in hotels around the world writing. In this post, I share insights on the current state of S&OP technology adoption.

Gaps in Technology for S&OP

Over the last 18 years, I have studied Sales and Operations Planning (S&OP) as an industry analyst. S&OP is not a new process. It is over 36 years old.

Figure 1. Current Gaps in Organizational Alignment.

Team Alignment: Importance vs. Performance
(Rated 5-7 on 7-point scale)



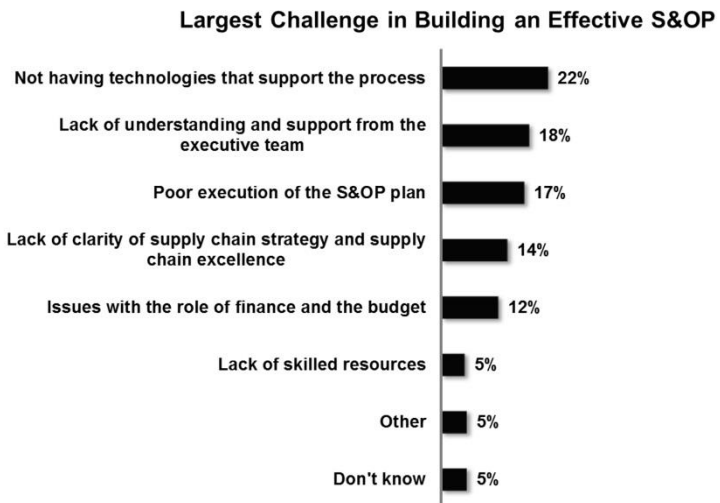
Source: SupplyChain Insights LLC, Cross-Survey Analysis 2012-2015
 Base: Manufacturers, Retailers, Distributors, 3PLs answering the question - Answered importance/performance (n=536/607)
 In your opinion, how important do you believe it is for each of the following pairs of teams to be aligned? SCALE: 1=Not at all important, 7=Extremely important
 How aligned do you believe that these same pairs of teams actually are? SCALE: 1=Not at all aligned, 7=Extremely aligned

The goal of Sales and Operations Planning is to drive organizational alignment and improve balance sheet results. It is a monthly process that most companies struggle to implement.

One of the biggest issues is alignment. By definition, organizations are not aligned; and as a result, many teams attempting to implement Sales and Operations Planning processes will feel like they are pushing water up hill. In Figure 1, I share the current state of organizational alignment from our recent research.

When companies are able to design and implement mature S&OP processes the organization rates itself higher on both alignment and agility.

Figure 2. Organizational Gaps in Building a Mature Sales and Operations Planning Process



Source: Supply Chain Insights LLC, Cross-Survey Analysis 2012-2015
 Base: Manufacturers, Retailers, Distributors, 3PLs answering the question (n=201)
 What is your company's single, largest challenge in building an effective Sales and Operations Plan (S&OP)?

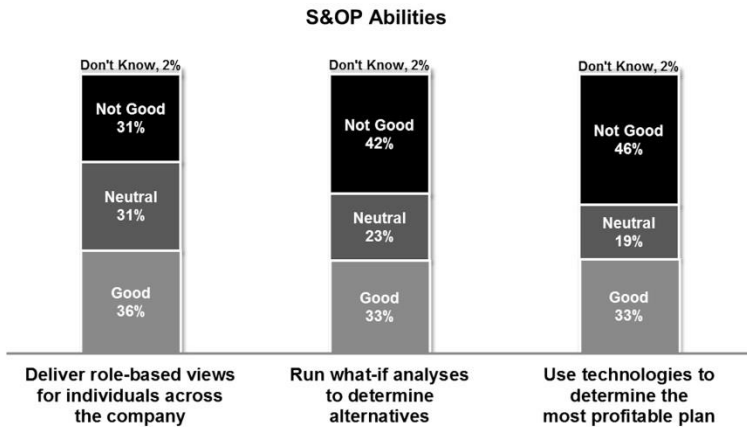
The successful use of supply chain planning technologies has a high correlation for companies that are the most mature in S&OP. Today, only one in three companies is satisfied with their current technologies.

As can be seen in Figure 2, the gap in technology capabilities is currently the largest barrier to driving improvement. Why is this? To successfully implement S&OP, companies need role-based views, what-if analysis, and the ability to determine the profitability of plan alternatives. For most organizations, this is an issue.

Focus Areas.

The current state is shown in Figure 3. Only 1/3 of companies surveyed have what they need to be successful with S&OP. The issue is twofold. The traditional definition of supply chain advanced planning did not include the requirements for S&OP; and as a result, most companies are using Excel spreadsheets that are inadequate.

Figure 3. Gaps in S&OP Technology Capabilities



Source: Supply Chain Insights LLC, Cross-Survey Analysis 2012-2015
 Base: Manufacturers, Retailers, Distributors, 3PLs answering the question (n=206)
 How would you rate your company on its ability to do each of the following? SCALE: 1=Poor, 7=Excellent

What do you do? The answer is simple. Don't confuse S&OP technology as an extension of conventional supply chain planning. When selecting a technology for S&OP, be sure to list the requirements for these three areas on your technology check-list for the selection team. Good luck in your work in S&OP. I can clearly see in balance sheet results that improvements in supply chain agility drive metrics improvement.

While some may argue that S&OP is not a technology implementation, and that this post is not relevant, let me say that I agree; but disagree. Clearly organizations must align towards the business goals, and this comes first. In small regional implementations the technology is not as important; however, for global and multi-national supply chains, as shown here, to sustain S&OP progress, they must find the right technologies. Unfortunately, too few have what it takes to drive S&OP processes to the highest level.

Five Insights on Effective Sales and Operations Planning

An effective S&OP plan is the goal of many, but there is no clear industry definition of what defines effectiveness. While there are many maturity models, most are not research based and grounded in a clear understanding of what drives balance sheet performance.

To better understand the characteristics of an effective S&OP plan, we recently completed a study of 73 companies. In the quantitative survey, 30 respondents rate their processes as effective and 43 rate their S&OP processes as less effective on a seven point scale.

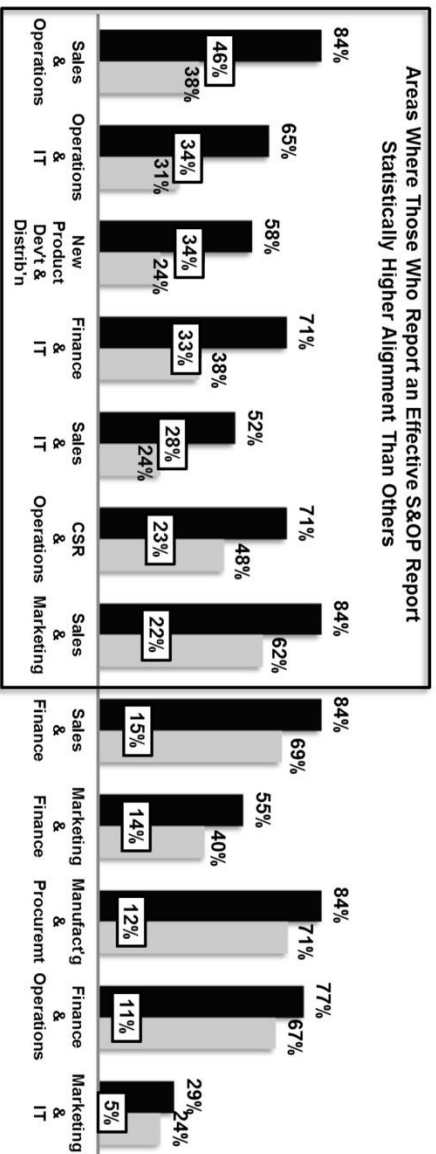
In this post we share five characteristics of companies that rate their S&OP processes more effective:

1. **More Likely to Focus on Delivering a Profitable Plan.** While the majority of companies focus on balancing demand and supply (an analysis based on volume), those rating their S&OP plans as effective have a focus on balancing cost, volume, and mix. This is a maturity factor. Twenty-three percent of the companies in the study are able to determine the most profitable plan.
2. **Tie the S&OP Plan to Execution.** While 65% of companies with an effective S&OP process tightly couple S&OP planning to execution, only 23% of those rating S&OP as not effective tie S&OP to execution. Planning in isolation, not connected to execution is a major factor in the analysis.

Figure 1. Impact of S&OP Effectiveness on Horizontal Functional Alignment

Team Alignment Performance*: Effective S&OP vs. Other

■ Effective S&OP ■ Other □ Gap (Effective - Other)



Source: Supply Chain Insights LLC, Sales & Operations Study (Jan-Sep, 2015)
 Base: Manufacturers and distributors who sell items they manufacture, have \$250M+ in revenue, have a S&OP process -- Effective S&OP (rated 5-7 on 7-pt scale) (n=31). Other (rated 1-4 on 7-pt scale) (n=42)
 C37: How aligned do you believe that these same pairs of teams actually are at your company? SCALE: 1=Not at all aligned, 7=Extremely aligned
 *Showing those rating elements 5-7 on 7-point scale. CSR = Corporate social responsibility; □ Higher than other group at 90% or higher level of confidence

3. More Aligned. Companies rating themselves more effective have tighter cross-functional alignment. The differences, as shown in Figure 1, are significant at a 90% confidence level. While we are unsure which happens first--whether an organization focused on alignment and improves S&OP, or if better alignment is the outcome of S&OP--we can see the impact of alignment in the open-end responses. Companies with greater alignment find it easier to conduct an effective S&OP process.

Table 1. Use of Technologies in S&OP

Types of S&OP Technologies Used		
	Effective S&OP	Other
	A	B
Spreadsheets	87%	86%
Forecasting	71%B	48%
Supply planning	65%B	38%
BI tool	42%	24%
Collaborative forecasting	32%	19%
Specialist S&OP	6%	7%
Workflow tool	6%	2%
Average # Technologies	3.3B	2.3

Source: Supply Chain Insights LLC, Sales & Operations Study (Jan-Sep, 2015)
 Base: Manufacturers and distributors who sell items they manufacture, have \$250M+ in revenue, have a S&OP process – Effective S&OP (rated 5-7 on 7-pt scale) (n=31), Other (rated 1-4 on 7-pt scale) (n=42)
 Q19. What type of S&OP technology, if any, does your company currently use? Please select all that apply.
 AB Higher than other group at 90% or higher level of confidence

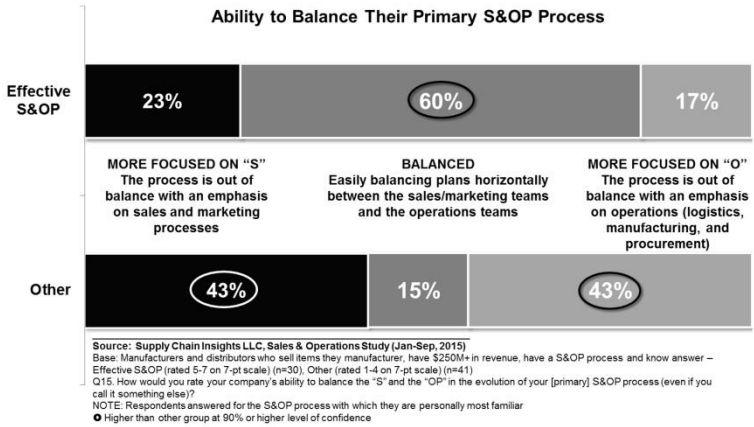
Top Two

4. More Likely to Use Planning Technologies. Companies that rate their S&OP processes more effective, as shown in Table 1, are more likely to use supply chain planning technologies in their processes. Those ranking their S&OP processes more effective have a greater dependency on technologies.

5. More Balanced. In addition, companies rating themselves as more effective in S&OP have greater balance between the "S" and the "OP". There is bal-

ance between the focus on commercial and operational plans. This difference is significant at a 90% confidence level.

Figure 2. Balance in S&OP



What do you think? Any surprises?

Driving Inventory Effectiveness

I remember the plane ride well. My career was in transition. I was moving from a position where I led a manufacturing operation to being a part of a team to design supply chain software to improve planning decisions. I was moving from the world of manufacturing to a new world of software.

As I read the brochure of my new employer on the airplane, I felt so behind. The words and concepts were foreign. A feeling of hopeless despair swept my body. This lasted for weeks. When I went through the training to learn the new software, I struggled. The names of the technology providers, the process definitions, and the architecture descriptions were a new lexicon. For a business gal it was a new world.

Now I know that I was not behind. The tension I felt reading the brochure on the plane is what I believe every supply chain leader feels every day. The technology world moves at a quicker pace than the world of manufacturing and distribution. The language and the expectations are different. It is hard to sort through the marketing speak of software vendors to get to the true facts. That is one of my primary drivers at Supply Chain Insights. As a team we conduct quantitative research of supply chain leaders to help gain clarity of the answers. It is my goal to sort the wheat from the chaff and help the supply chain leader quickly get to what is valuable.

Why do we do this? We think that it matters. Growth is slowing and the complexity is escalating. The impact of complexity on inventory is not quick. It is a slow, continued impact that happens week-to-week as complexity increases. It is a lot like that five pounds gained each year that adds up to 20 before you know it.

To help, today I want to share some of the insights from our recent Inventory Optimization study.

The Business Problem

Inventory management is a hot issue. Tension abounds between corporate finance and the operations teams. Why? Companies invest in project after project, yet inventory levels remain the same. The analogy is weight loss. While we all want to lose weight, it is not the big program that improves weight loss. Instead, it is the discipline every day.

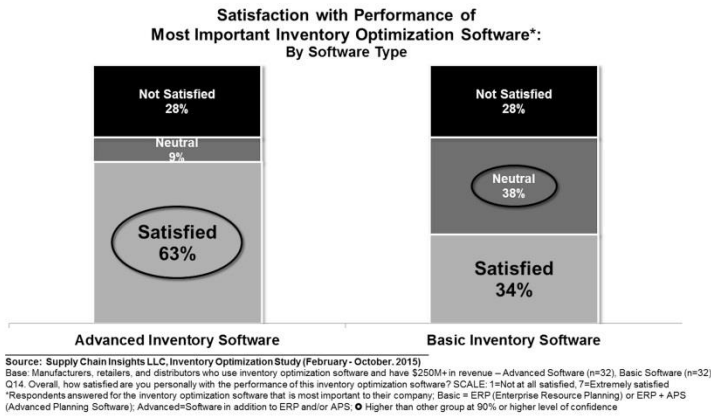
In business there are many drivers of inventory, and the management of inventory levels requires discipline and a cross-functional focus. The rise of the global multinational has greatly impacted inventory requirements. How so? In to-

day's global supply chain there is more in-transit inventory and complexity. The changes may seem slow, but they add up. Here are some examples: Item and process complexity increases inventory requirements for cycle and safety stocks; Slow steaming and larger ocean vessels affect inventory levels in transit; Intermodal slows transportation and increased inventory; The greater the number of nodes in the supply chain, the greater the inventory levels; The higher the demand volatility, the more inventory required.

Supply chain processes are now over 30-years old. While there is a generalized belief that maturity of supply chain processes has improved inventory turns, this is not true for nine out of ten companies. In fact, many are stuck in a bad way, like a car trying to get traction in a snow bank. Many teams just do not know where to start, and the swirl of inventory technologies confuses the teams much like how I felt reading my first brochure on supply chain planning 25 years ago.

Improvements in cash-to-cash have primarily been driven by lengthening payables. First it was 60 days, then it was 90 days, and for many now the discussion is 120 days. It cannot go further. I feel that the lengthening of payables is like a bad drug. It pushes waste and costs to the suppliers and gives the organizations a short-term *high*. The teams feel good because cash-to-cash metrics improve; but in many cases, in the joyous celebrations, companies do not realize that they have reduced capabilities with suppliers and not made improvements in inventory. In industries like beverage, pharmaceuticals, consumer packaged goods, and medical device, the industry averages have gone backwards (inventory turns have decreased, not increased) during the period of 2006-2014.

Figure 1. User Satisfaction with Inventory Optimization Software



What Drives Inventory Effectiveness?

In the last year we completed a study on inventory optimization. In the study we compared company maturity on meeting inventory targets to choices on inventory technologies. We had 64 respondents: 32 used basic software (ERP or Advanced Planning) and 32 were using more advanced capabilities from Multi-Tier Inventory Optimization solutions (often termed Multi-Echelon Inventory Optimization, or MEIO). Technology vendors love acronyms. The names defy logic.

We also compared the sample to a self-assessment on inventory effectiveness. The companies using more advanced technologies rate themselves more satisfied. The test is significant at a 90% confidence level.

As shown in Table 1, companies that rate themselves as more effective meeting their inventory goals are more likely to be located in North America than Europe. They are also more distribution centric i.e. retail and consumer packaged

goods. They have a higher satisfaction with the use of the software and were able to drive a return on investment. The adoption of more advanced capabilities takes time (16 months on average versus nine months). It is not something that happens overnight. As a result, companies rating themselves as effective in making inventory decisions have managers that better understand the use of these deeper solutions.

The Role of Technology in Driving Improvement

In driving inventory improvements, the technology choice is one part of the equation. The two most important factors which are not performing well are S&OP maturity, and the adherence to S&OP targets. While organizations are not performing well on forecast accuracy, the proper design of flows and buffer strategies through the use of more advanced inventory software can overcome the issues with high demand error. Increasingly, in the research we see adherence to inventory targets based on software recommendations as a key to success. While this sounds easy, it is not.

Organizations have difficulty accepting answers from a ‘black box’ optimizer and many finance groups mistakenly play with inventory levels to meet quarterly and yearly Wall Street commitments. In our research on the Supply Chains to Admire analysis, we see the use of more advanced technologies, the adherence to inventory targets from the technologies, and the maturation of Sales and Operations Planning as the keys to success to drive continued improvement of inventory levels while improving margins and driving growth.

Table 1. Profile and Comparison for Advanced Software Users of Inventory Optimization versus Basic Inventory Software Users

Profile of Advanced Inventory Software Users vs. Basic Software Users*			
CATEGORY	ANSWER	Advanced Inventory Software	Basic Inventory Software
INVENTORY SOFTWARE	SATISFIED WITH INVENTORY SOFTWARE	A	B
	RETURN ON INVESTMENT	63%B	34%
	ROI Received on Inventory Software	63%B	31%
	Average # Months to ROI (mean)	16B	9
	HAVE ABILITY TO MATCH TOP-DOWN TARGETS WITH BOTTOM-UP CALCULATION		
	Yes, have ability	34%	22%
	No, but have the need for it	31%	53%A
	No and do not need it	13%	9%
	EFFECTIVENESS AT MAKING INVENTORY DECISIONS		
	Effective	56%	41%
Not Effective	22%	44%A	
INVENTORY MANAGEMENT	REDUCED INVENTORY IN 2014	69%	50%
	INVENTORY ACCURACY (counted inventory = inventory in ERP system)		
	Use cycle counting to control inventory accuracy	75%	56%
	Average inventory accuracy in 2014	93%	94%
	LEADERS UNDERSTAND INVENTORY STRATEGIES		
	Direct supervisor	75%B	53%
	Functional vice president	66%	56%
	P&L owner	50%	41%
	Chief Supply Chain Officer	72%	69%

Source: Supply Chain Insights LLC, Inventory Optimization Study (February, October, 2015)

Base: Manufacturers, retailers, and distributors who use inventory optimization software and have \$250M+ in revenue – Advanced Software (n=32), Basic Software (n=32)

*Respondents answered for the inventory optimization software that is most important to their company. Basic = ERP (Enterprise Resource Planning) or ERP + APS (Advanced Planning Software); Advanced=Software in addition to ERP and/or APS. **AB** Higher than other group at 90% or higher level of confidence

The Role of Finance

While the supply chain organization has the primary responsibility to reduce inventory in over 97% of companies surveyed, the effective use of the technologies requires close coordination and alignment with corporate finance. This requires a carefully crafted change management program.

The lack of understanding of inventory by finance is a major barrier in the effective usage of technology. As a result, it should come as no surprise that companies that are more advanced in their use of inventory management software have closer alignment with finance and the operations group, and between the sales and finance groups. The difference in alignment is significant at a 90% confidence level.

In the study, we ask respondents to answer “open-ended questions” on inventory effectiveness and the use of the technologies. Below we share some of the responses.

Open-Ended Responses

“SAP APO is inflexible and has poor ergonomics, but it does allow visibility of the global stock equation and to a single view of end-to-end inventory visibility.”

“The only way to drive success is to have a team that uses the software.”

“We have not thought about inventory in a strategic way. Instead, for years, we have focused on costs.”

“Financial pressures to continually reduce inventory are not well understood. We constantly fight the impulses of finance to reduce inventory.”

“We have too great of a reliance on spreadsheets.”

“Incentive systems do not promote alignment on inventory strategies.”

Table 2. Organizational Horizontal Alignment by Type of Software Used to Guide Inventory Decision Making

Team Alignment Performance*: By Inventory Software Type		
Teams	Advanced Inventory Software A	Basic Inventory Software B
Sales and Marketing	69%	72%
Finance and Operations	84%B	50%
Sales and Finance	78%B	50%
Sales and Operations	59%	53%
Manufacturing and Procurement	59%	50%
Finance and IT	53%	50%
Operations and IT	50%	47%
Marketing and Finance	59%B	34%
Corporate Social Responsibility and Operations	50%	38%
Sales and IT	34%	34%
Marketing and IT	19%	22%

Source: Supply Chain Insights LLC, Inventory Optimization Study (February, October, 2015)

Base: Manufacturers, retailers, and distributors who use inventory optimization software and have \$250M+ in revenue – Advanced Software (n=32), Basic Software (n=32)

Q33. How aligned do you believe that these same pairs of teams actually are? SCALE: 1=Not at all aligned, 7=Extremely aligned

*Showing those who rated it 5-7 on a 7-point scale (top 3 box). Basic = ERP (Enterprise Resource Planning) or ERP + APS (Advanced Planning Software);

Advanced=Software in addition to ERP and/or APS; AB Higher than other group at 90% or higher level of confidence

Top 2 Performing

So, if you are seeking to improve inventory turns should you consider the use of a multi-tier inventory management system? My answer is yes. However, the name is misleading. Why? While the name signifies the use across multiple nodes, the greatest benefit today is the use of deeper optimization to managing inventory within the enterprise. Few companies have deployed the solution as a value chain solution.

When you implement the software, what is my advice? Go slow. Don't try to rush the project. Focus on form and function of inventory as opposed to inventory levels, and train the finance team on the role of inventory in market-driven value networks. Most financial teams see inventory as waste to eliminate and a cost to optimize. This is a major change management issue. Tackle it early. The teams lack the understanding of inventory as a way to buffer demand and supply variability. This comes over time.

In closing, we cannot complete surveys without the help of our readers. So, if you filled out the survey, I want to thank you for helping us with our study on inventory management. It was a hard survey to complete. The reason? There are few companies that have implemented advanced inventory management technologies. At Supply Chain Insights, this month, we are completing our 60th survey.

Eight Myths in Selecting an S&OP Technology

Sales and Operations Planning (S&OP) is in a renaissance. The reason? With growth slowing and complexity rising, S&OP is more important than ever. It is not sexy, and it requires hard work; but the greatest value of S&OP is profitable growth.

The technology market is rife with unsubstantiated claims and myths. Like a hammer looking for a nail, it seems like every vendor I meet now has an S&OP solution. It is comical. For many, I shake my head and smile. Putting the name S&OP on a piece of collateral does not help a vendor make my list. Each year, I publish a report analyzing the technologies in the S&OP space. Finishing this report was my focus

this week. It took me six months to do the research and 60 hours to write the report.

Needless to say, completing the report was a lot of work. I sent the report to technology vendors listed in the appendix with a deadline for feedback on factual accuracy of 5:00 p.m. ET on Wednesday. Only 15% met the deadline and 60% gave me far more information than a factual review. I smiled as I read the multiple opinions.

Squeezing in this much time to write this deep report between working on the Supply Chain Insights Global Summit and finishing customer deliverables is tough. However, I think that it is important work. Many clients ask me about the vendors and I think that it deserves a comprehensive review. I find it easier and more comprehensive to send a report for review than to answer each email.

The analysis is too complex to use one of those sexy and over-marketed magic four-box charts. It is about more than *magic*. The technology choices are not black and white. In analyzing the options, there are many subtleties and contextual issues. In my view, a four-box model by an analyst firm is a cop-out. It is just too easy. In this report, I list 35 vendors and share the strengths and considerations based on demonstrations, discussions with references and my discussions with clients. I will watch the comments on this new one closely to see how to improve the report.

What Is New?

I have done this report twice before, once in 2012 and again in 2013. It is a rewrite. Why do it again? It is a well-read report. Business leaders request it. The last one had over 3700 views on SlideShare.

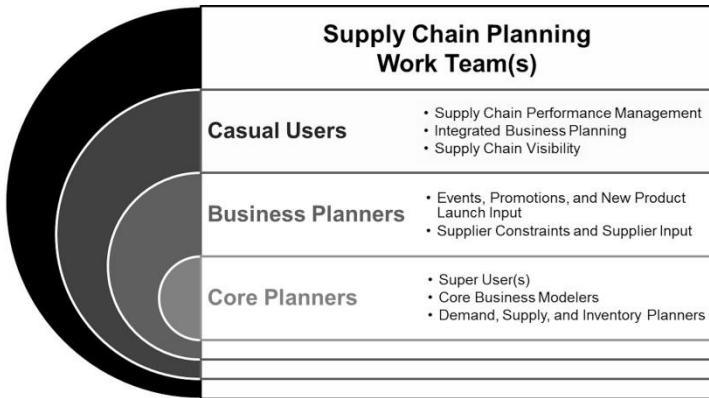
The news? Here is my take:

- **New Solutions. New vendors.** New technology is evolving. The entrepreneurial spirit is attracting new vendors to this space. This year, I added Anaplan, Exceedra, o9, and Orchestr8 to the report. Technologies natively written as Software as a Service (SaaS) solutions are entering the market.
- **For the Love of the Cloud.** Only three vendors on the technology list do not offer a cloud-enabled service. This is a major turnaround. When I wrote a summary report at AMR Research in 2007 and 2009, there were two or 6% of the market. While we may argue the definitions--I define hosted as a solution that operated in the cloud for the client and SaaS as a more stringent definition including automatic software updates--the primary deployment today for S&OP is cloud-based services. In the report, 95% of the solution providers offer hosted solutions and some version of SaaS. S&OP is moving to the cloud. I think that this is great for line-of-business users.
- **Financial Ownership.** Like musical chairs, the ownership structure of the vendors is changing. Since the last report, Kinaxis successfully launched an IPO on the Toronto Stock Exchange, E2open launched an IPO and then went private with a buy out by Insights, IBS and Steelwedge sought new rounds of capital, and WAM Systems and Acorn Systems have new owners. In addition, 85% of the vendors in the multi-tier inventory optimization market that I wrote about in 1995, are now part of larger platforms.

- **Visualization.** Visualization is improving. Two vendors --Tagetik and Terra Technology--adopted QlikView into their solution, and Logility introduced a visualization application that crosses over applications in a heterogeneous environment. JDA's interface is greatly improved. Data visualization is quickly advancing in the tools.
- **User-Based Configuration.** One of the issues that clients face is the ability to configure the application to meet their needs. In the case of Anaplan and o9, user-based configuration becomes easier. In these applications, the user can configure the solution more readily.
- **Evolution of S&OP Options for SAP.** I like what SAP is doing for SAP IBP. In many organizations, SAP is a planning system of record for hundreds and thousands of planners. The needs for collaboration and visibility of these planners are high. In my opinion, the design of the solution is ideal for the more casual and line-of-business user. (This perspective is not shared by SAP.)

A planner is not a planner. In these larger organizations, as shown in Figure 1, the needs for integration, collaboration, and role-based security are high. This is especially true for the casual and business planners. While SAP still has not proven itself to me as the right technology for core planning (either SAP HANA or SAP APO), I like the concept of SAP IBP for the casual users and business planners to improve collaboration and visibility.

Figure 1. Supply Chain Planning Work Teams



The problem is that it is new, and in reference calls with users, companies are still working out the kinks. This is not unusual. It happens with all systems. The solution needs to mature, but the good news is that SAP is investing in supply chain.

Where are the issues? Currently references report issues with the HANA Cloud Integrator and HANA support. When clients call for support there are two desks: one for the SAP IBP S&OP application and one for the HANA cloud integrator. While clients report great support from the SAP S&OP team (strong accolades), there are struggles with the second customer support team to support the HANA integrator. Working through it takes time. It is not insurmountable. The documentation is evolving and there are few trained consultants. This is all normal. Vendors have issues with new solutions. This is why they are best adopted by companies with a high threshold for business pain and a strong understanding of new solutions.

In the development of the report, I spoke to six SAP Client References now using SAP IBP for S&OP. SAP supplied

none of the references. Instead, the references came from my client contacts and through connections with systems integrators. (I often find that references from the technology client are the worst references. They are typically groomed by the vendor.) In summary, I think SAP IBP S&OP is promising, but it is only for the early adopter with strong SAP skills. It is costly, and evolving, but I think promising. (For more, please read the report and let me know your thoughts.)

What Are the Myths?

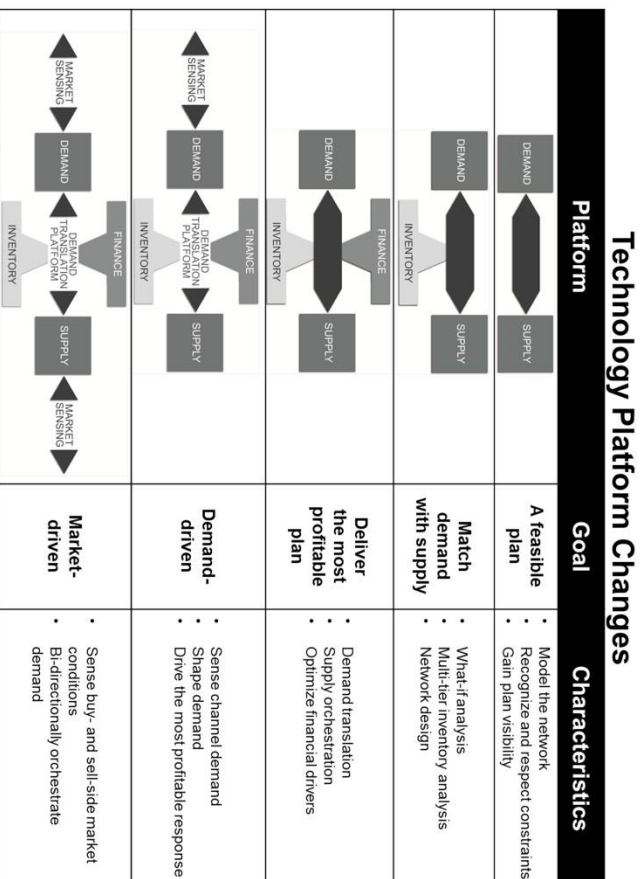
Despite the hype and the hoopla, eight myths in S&OP technology remain. I detail these myths in the report, but I think that they are worth noting here.

Myth #1: Companies don't need a technology to drive an effective S&OP process.

In my research each and every day, I am constantly reminded that you cannot start and end with technology. S&OP is 60% change management/organizational culture, 30% process and 10% technology, but you cannot reach your goals without a technology. The reason? It is just too complicated.

The technologies evolve over time, and move through stages. Companies have to put together the pieces to drive a solution. The definition of demand translation is the understanding of changes in product mix and management of demand changes. It is the green arrow in Figure 2. The ability to translate—not just integrate—mix changes and understand the impacts is an important criteria for building the S&OP foundation.

Figure 2. Stages of Technology Evolution with Process Maturity



Source: Supply Chain Insights LLC

Myth #2: S&OP can be effectively modeled using a spreadsheet.

Many companies over the last decade built Excel ghettos and implemented reward systems for spreadsheet jockeys. When I go to meetings, I laugh as companies argue about which spreadsheet is accurate. I am convinced that the complexity of today's supply chain as a complex system cannot be modeled using an Excel spreadsheet. Additionally, I believe that the use of multiple spreadsheets creates uncontrolled chaos and unnecessary work.

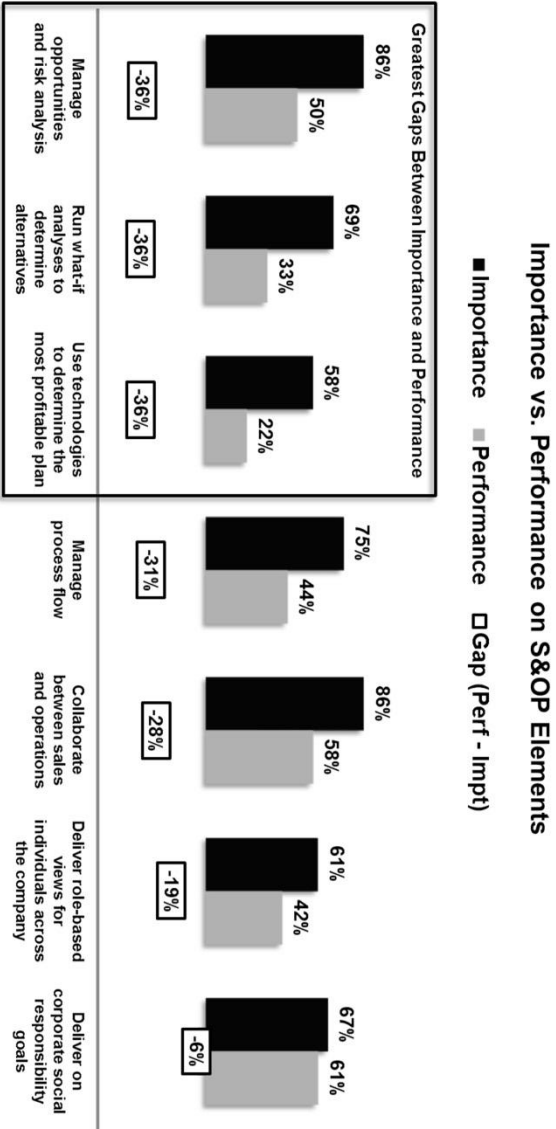
Myth #3: An 80% technology fit is good enough to drive a successful S&OP process.

I have heard this a lot from the consulting providers, and I used to believe it. I do not anymore. The devil is in the details, especially in the area of supply. Modeling supply to develop a feasible plan requires the right technology. The problems are tough: issues like alternate bill of materials, floating bottlenecks, constraints, customer segmentation strategies and multi-tier inventory optimization requires robust technology.

Myth #4: Standardize - One solution provider is all one company needs.

Organizations are bigger and bigger with over 2700 mergers and acquisitions in the process industries within the last seven years. Deep inside the business are many supply chains, each with a different need. While IT standardization sounds like the right thing to do to lower costs and better focusing IT resources, there is an opportunity cost. To do S&OP well, which leads to cost savings, improved customer service and better inventory, the company must effectively model supply.

Figure 3. Process Gaps in Sales and Operations Planning



Source: Supply Chain Insights LLC, Sales & Operations Study (Jan-May, 2015)

Base: Manufacturers and distributors who sell items they manufacture, have \$250M+ in revenue, have a S&OP process (n=36)

Q21. How important is it for your company to do each of the following? SCALE: 1=Not at all important, 7=Very important

Q22. How well does your company perform in each of these same areas? SCALE: 1=Poor, 7=Excellent, 0=Not applicable

Showing those rating elements 5-7 on 7-point scale

While demand technologies are more ubiquitous—with one solution having a better chance of meeting the needs of multiple businesses, the supply technologies are different. Supply modeling requires careful tailoring based on business modeling to drive the value.

Myth #5: S&OP is dead. Integrated Business Planning (IBP) is the new solution.

I frankly have little time to argue the names. Many people do. Many consultants have made IBP the horse to ride to drive new revenue. I feel that IBP aligns the organization cross-functionally to move the organization faster to maximize opportunity and mitigate risk; but as shown in Figure 1, I think that it is a stage in maturity, not the end state. I think that the end state is the outside-in value chain process that senses and adapts with the market. All companies should start with the building of a feasible plan—a plan that can accurately model supply constraints. As seen in Figure 3, one of the greatest performance gaps is developing and managing a profitable plan analysis. However, this is not the starting place on process evolution. Companies must build to this stage.

Myth #6: Real-Time S&OP is the desired outcome.

While the clock speed and cadence of business is increasing, there is still the need for planning. Planning looks at a longer-term view: evaluating and looking at business in the future for months 12-18 months out. It takes time and focus to plan. When organizations are head over heels reacting, they lose the benefits of planning. Organizations must not confuse the urgent with the important. The most effective S&OP plans are monthly with weekly execution processes.

Myth #7: Tight integration with Enterprise Resource Planning (ERP) improves the S&OP process.

While transactional systems need to be tightly integrated with operational systems, I don't think that it is as necessary with planning. (Operational systems are warehouse management, available to promise, and transportation planning.) It is less important for planning. The transfer of data is more periodic with weekly and monthly updates of the optimization data tables, and all technology vendors have built standard APIs for data transfer.

Also, just because the data comes from the same vendor—Oracle, SAP or Infor—does not mean that the data is cleaner. Data cleanliness takes rigor and discipline. It is an organizational characteristic.

Myth #8: Tight integration with the financial budget drives the best results.

A financial budget is quickly out of date, but it is an important baseline for business management. In the most mature S&OP processes, S&OP is an update to budget forecasts updates. However, if the goal is to maximize value, the S&OP process should never be constrained by the budget. This is an area of tension.

These are my thoughts. I would love to hear from you.

S&OP Effectiveness: Recommendations to Make the Leap

It is a beautiful fall day in Philadelphia. This afternoon I put the finishing touches on a new report, "What Is the Value Proposition for Sales and Operations Planning?" I think it is the most complete assessment of the S&OP value proposition I have seen in the industry.

It is always fun to write great research. I am so excited about it that I thought I would repurpose some of the recommendations into a quick post before I bolt for ballet.

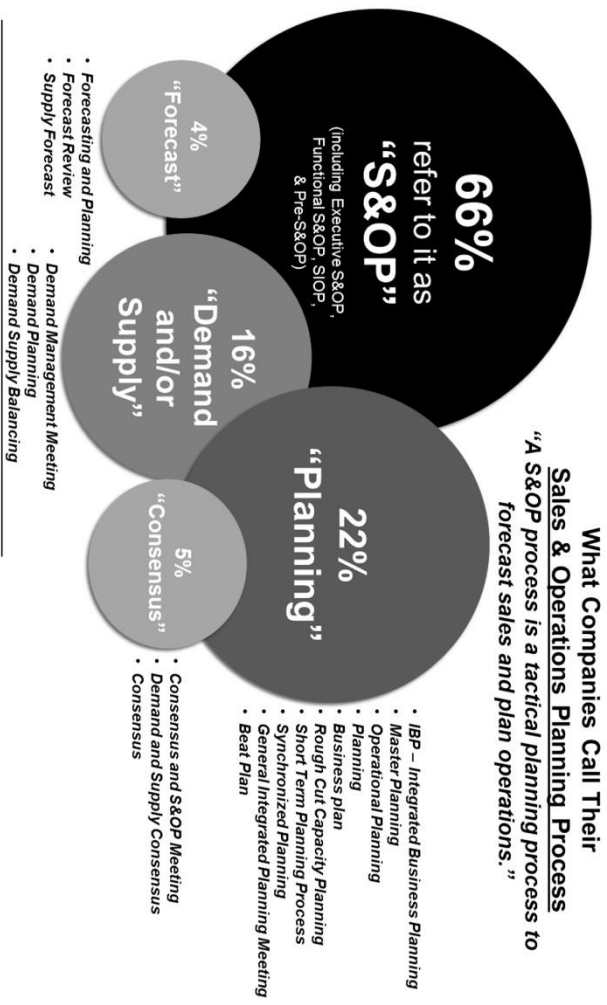


Background: More to It Than a Name

Sales and Operations Planning is a cross-functional process to make trade-offs between go-to-market strategies and operational plans. The processes are very different by company. In the research of 73 respondents, we asked companies to classify themselves on a 1-7 scale of effectiveness, and the report is a study of the characteristics of those rating themselves effective when compared to those who rate themselves less effective.

While many consultants argue on the name—the debate rages with strong arguments of "Should it be Integrated Business Planning (IBP), Sales Inventory and Operations Planning (SIOP), or consensus planning?"—the most common name for the process, as shown in Figure 1, is still Sales and Operations Planning. Building S&OP maturity takes time, discipline and focus. While the debate rages on the right name to call the process, we find that there is no correlation to the name of the process and maturity or value gained.

Figure 1. Names for the Cross-Functional Process to Align Demand and Supply



Source: Supply Chain Insights LLC, Sales & Operations Study (Jan-Sep, 2015)
 Base: Manufacturers and distributors who sell items they manufacture, have \$250k+ in revenue, have a S&OP process -- Total (n=73)
 Q11. What does your company call your [primary] S&OP process? TEXT RESPONSE.

Table 1. Profile of S&OP Respondents

Profile of Those Who Report S&OP Is Effective vs. Others			
	Effective S&OP	Other	
		A	
S&OP Technology & Implementation	Spreadsheets	87%	86%
	Forecasting	71%B	48%
	Supply planning	65%B	38%
	AVERAGE NUMBER	3.3B	2.3
	Top Challenge: Difficulty getting to the right data in a timely fashion	65%	62%
Implementation Challenges	Lack of time to execute the process	19%	48%A
	AVERAGE NUMBER	4.2	5.5A

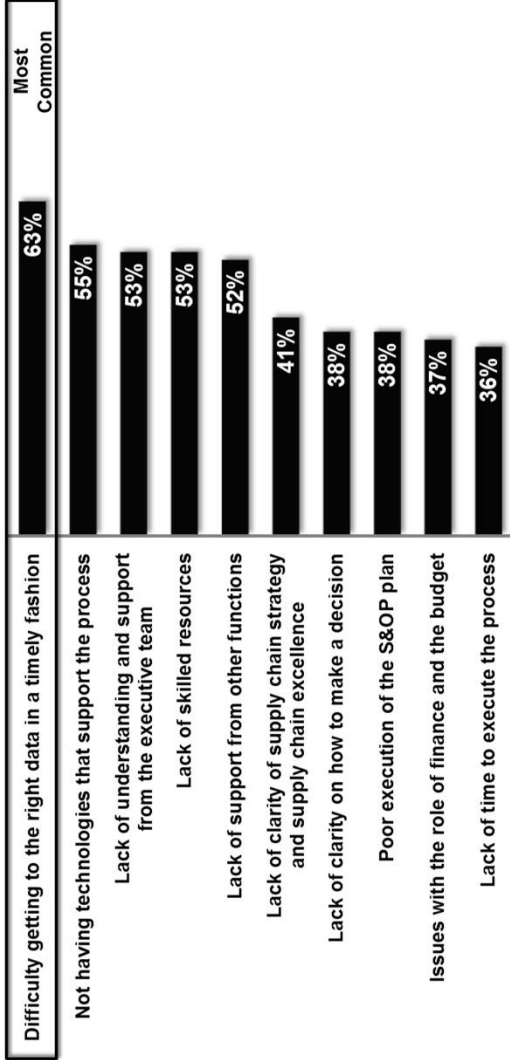
Source: Supply Chain Insights LLC, Sales & Operations Study (Jan-Sep, 2015)
 Base: Manufacturers and distributors who sell items they manufacture, have \$250M+ in revenue, have a S&OP process – Effective S&OP (rated 5-7 on 7-pt scale) (n=31). Other (rated 1-4 on 7-pt scale) (n=42)
 NOTE: Respondents answered for the S&OP process with which they are personally most familiar
AB Higher than other group at 90% or higher level of confidence

As companies focus on improving the maturity and effectiveness of Sales and Operations Planning, there are three recommendations embedded in the research for consideration:

1. **Give Planners Time to Plan.** As shown in Table 1, one of the distinguishing characteristics of an effective S&OP plan is the time for planners to plan. This is not trivial. Many companies struggle on how to evaluate planning effectiveness and productivity. No two companies are the same, and there are many technologies used. However, companies that do S&OP well give their planners time to plan. They make it a priority.
2. **Focus on Helping the Right People Get to Data.** When we shared this data with the roundtables of supply chain leaders who had completed the study, a number of attendees shared stories of how they had met the challenge of helping employees/planners to get to data. When it comes to data storage, every organization is different. One of the suggestions which resonated with the participants was teaching new employees tips and tricks for data storage and document sharing. Several commented they had developed this training as part of onboarding. As shown in Figure 2, S&OP processes use many technologies, but getting to data is a challenge for all companies. Make it a priority to train employees on data storage and retrieval.

Figure 2. S&OP Challenges

Challenges with Initial S&OP Process Implementation
5 challenges on average



Source: Supply Chain Insights LLC, Sales & Operations Study (Jan-Sep, 2015)
Base: Manufacturers and distributors who sell items they manufacture; have \$250M+ in revenue, have a S&OP process -- Total (n=73)
Q31: Thinking about when your [former] S&OP process was first implemented, what were the challenges that your company encountered with the implementation? Please select all that apply.

Table 2. The Role of the Financial Budget in S&OP Processes

Role of Financial Budget in Primary S&OP Process		
	Effective S&OP A	Other B
The budget is an input to the S&OP process, but does not constrain it	61%	50%
The S&OP process is an input to the budget, but is not constrained by it	42%	26%
Budget goals drive and constrain the S&OP process for Inventory	19%	29%
Revenue goal alignment is determined by the data output of S&OP	39%B	12%
We do not use financial data in our S&OP process	16%	17%
Cost goals in the budget are updated based on the output of S&OP	13%	12%

Source: Supply Chain Insights LLC, Sales & Operations Study (Jan-Sep, 2015)
 Base: Manufacturers and distributors who sell items they manufacture, have \$250M+ in revenue, have a S&OP process – Effective S&OP (rated 5-7 on 7-pt scale) (n=31), Other (rated 1-4 on 7-pt scale) (n=42)
 Q24. Which of the following describe the role of your company's financial budget in your [primary] S&OP process? Please select all that apply.
 NOTE: Respondents answered for the S&OP process with which they are personally most familiar
 AB Higher than other group at 90% or higher level of confidence

- 3. Educate the Financial Team on How to Use the S&OP Process in Budget Forecasting.** One of the barriers in maturing S&OP processes is the role of the financial budget. While many companies believe the role of the S&OP process is to deliver on-budget processes, as companies mature they realize the S&OP plan is an input into the budget process, but that the budget process should never constrain the S&OP process. The goal is to keep the S&OP process aligned to the market. As shown in Table 2, this is a characteristic of effective S&OP processes. As a result, companies beginning their work on S&OP should train the financial team and hit this obstacle early.

I hope this helps you and your team to make the leap.

Throwing the Light to Drive Insights

I stumbled through the airport yesterday and found my way to my seat on the plane from Brussels to Philadelphia. (The joys of international travel.) While I wanted nothing more than to close my eyes and sleep, the flight attendant came down the aisle with a stack of newspapers. Mindlessly filling time, I flipped through the paper until I landed on an interesting article on the impact of e-cigarettes on the body. The question in the article was "Is vaping safe?" The essence of the article was that the leading expert on smoking, Johanna Cohen from John Hopkins, in USA Today bravely admitted that after four years of research that she did not know. I

clipped her explanation and put it into my purse. I found the writing beautifully described my dilemma:

"The degree of uncertainty isn't what makes science weak. It's what makes science strong. You see, science doesn't happen with the flip of a switch, but rather arrives incrementally as if by dimmer. It's only completely illuminating when we've fully turned the knob. And, the truth be told, we're never done turning the knob."

I think of myself as a scientist. A researcher, of sorts. When I started the work that I do at Supply Chain Insights, I termed myself an analyst; and while everyone wants to put me in the consulting bucket, I resist. To me a consultant works with a company on a project basis to implement processes or technology. I, on the other hand, am trying to figure out what defines supply chain excellence. I invest 25% of the proceeds of my small bootstrapped company into quantitative and qualitative studies to understand trends in supply chain excellence and gain insights on the views of business leaders.

In this journey, Johanna Cohen's concept of the "dimmer" spoke to me. The research I am working on started as deductive—with a set of fixed hypotheses and a clear objective function. Over time, it has morphed. Today it is inductive—where I let the data speak for itself. As I age, I admit more and more that I don't have the answers.

When I started Supply Chain Insights, I hired a specialist in consumer research to help me; and over time, I have gained great joy in the design of surveys. While I am not as good at the design and coding of the surveys as my research expert, Heather Hart, together I think we make a good team. Over the past nine years, I have learned a lot on how to design a survey. The work that we do is exciting, and slowly, like turning the dimmer, I think that we are making progress.

In the larger business world our work is not well understood. It is a new company with a new business model. We invest in research and give it away freely. People scratch their heads. We are mavericks.

The commercial model of the company is to make money through speaking, research studies for others, facilitated workshops, benchmarking, training, and events. The problem is that there are many—consulting companies, technologists and consortia—that term their work "research" and preach best practices. I find most to have opinions, but little research. There are many pundits and I think that we do not have "best practices." Instead, I think we have emerging practices. I feel we need to apply research methods to gain an understanding of the future state.

Figure 1. Research Efforts of Supply Chain Insights



In Figure 1, I share the work that we are doing at Supply Chain Insights. To date, we have finished 68 research studies, published 86 reports, and we sit on 6,364 survey responses. We take research seriously. I think this why the newspaper clipping speaks to me so vividly.

The research that I am doing is very different from that in academia. Academia looks to history and public citations as research. It inches along very slowly. In my work at Temple, to complete my Doctorate of Business Administration (DBA), in the last year I immersed myself in the world of academia. I have tried to do deep literature searches on the academic supply chain research in the journals. My struggle is that the field of supply chain is relatively new and the research is very limited. It is weak. The body of research in academia is not up to the standards of other fields like finance, corporate strategy, or marketing.

There are also strange nuances. As the supply chain field matures in academia, oddly, supply chain has found itself as a strange bedfellow with marketing. Ironically, while great gaps exist between supply chain alignment and marketing in the world of manufacturing, in most schools, supply chain management is a field within the business school often reporting to a marketing head.

Over sandwiches a couple of days ago at the OM Partners event in Antwerp, I spoke to a supply chain leader who I admire. She is serious about training her team on supply chain concepts and encourages all of her team to take the APICS certifications. Convinced she needed to do the same, she took the certification herself. Her dilemma was that she found the materials old. Her comments were, "APICS is out of date. I need a source of supply chain insights that is current." This is what we are trying to provide in a no-nonsense, Open Content research-based forum. I offer the research freely to both APICS and CSCMP, but find each of the organizations immersed in their own issues. I cannot change the world, but I would like to be the dimmer switch that can slowly help sup-

ply chain leaders understand how to drive supply chain excellence. This is why we launched our new community, Beet Fusion.

Let me give you an example. Many people ask me, "What is the value proposition for Sales and Operations Planning (S&OP)?" I have tried to answer this question many times and in different ways. One of the most interesting projects that we recently completed is a study where we asked companies to self-assess their S&OP processes on a scale of 1-7 based on perceived effectiveness. When we group the responses by Effective S&OP responses (scores of 6-7) versus those that Do Not Feel That They Have an Effective S&OP (1-5), we see distinct patterns in how they describe their organization. In Table 1, we share these differences:

Table 1. Characteristics of Effective S&OP

Supply Chain Descriptors*			
	Effective S&OP	Other	Gap (Effective – Other)
	A	B	% Point Difference
Room for improvement	55%	79%A	-24%
Agile	45%B	14%	31%
Pull	35%B	17%	19%
Reactive	35%	71%A	-36%
Outside-in	29%B	2%	27%
Strategic	26%B	10%	16%
Uncontrollable	6%	33%A	-27%

Source: Supply Chain Insights LLC, Sales & Operations Study (Jan-Sep, 2015)
 Base: Manufacturers and distributors who sell items they manufacture, have \$250M+ in revenue, have a S&OP process -- Effective S&OP (rated 5-7 on 7-pt scale) (n=31), Other (rated 1-4 on 7-pt scale) (n=42)
 Q32: For each of the following pair of words, please pick the one that best describes your company's supply chain today. 5 POINT SCALE
 *Data show those rating it 1-2 or 4-5 on a 5-point scale; AB Higher than other group at 90% or higher level of confidence

So, would you like to work on a program that could help an organization be more agile, strategic, and more in control? A program that could help companies be less reactive? The answer is an effective S&OP (with a 90% confidence level). However, what defines an effective S&OP process? Compa-

nies rating themselves with stronger capabilities are more likely to use supply chain planning systems, are more likely to be able to produce a feasible plan in supply planning, and use "what-if" analysis. We find that it is not one, it is many elements. One thing is clear to me, it does not happen without the use of planning technologies.

Over coffee last week, I asked a supply chain leader to comment on what makes a successful supply chain planning organization? His response, "It is inverse to the number of spreadsheets. Some of my planners have 500 per person. My goal is to minimize this number." I agree.

So, in closing, I want to thank all of my readers for helping us on our journey. It is our goal to write thought leading research to help the industry, and with your help, I think that we are making progress. We think that we are shedding light on an important subject.

SECTION 4

Building the Global Value Chain

If I Had a Magic Wand

As an analyst, when technology providers acquire and divest companies, I get invited to pre-announcement conferences. In these sessions the technology providers share their rationale for the investment and invite questions. Recently it was the acquisition of GT Nexus by Infor. The transaction closes in 45 days.

Infor, a market consolidator of enterprise software, currently has revenues of \$2.8 billion in sales and about \$800 million in earnings before interest and taxes in the past 12 months. Despite numerous acquisitions and product development efforts, SAP and Oracle are much larger industry giants. In 2014, SAP posted revenues of \$19.5 billion and Oracle with \$38.3 billion.

Founded in 2002, under the name of Agilisys, Infor re-branded in 2004. In the period of 2002-present, the company

acquired/aggregated many applications. The most significant for the supply chain market are assets from Baan, Formation Systems, Fygir, Intentia, Lawson, MAPICS, Mercia, and SSA Global.

The What

On August 13th, Infor announced the intent to purchase GT Nexus for \$675 million. Based on reporting from the Wall Street Journal, the company hired Morgan Stanley to shop the company and package it for sale in 2014 with an expected evaluation of \$800 million. At this size there were few possible suitors for the company. SAP and several other companies passed on the opportunity. Today, GT Nexus is privately held with 43% ownership by Warburg Pincus Equity Firm. The transaction is significant for both the market and for Infor. It's Infor's second largest acquisition. The largest was the purchase of Lawson in 2011 for \$2 billion.

GT Nexus began operations in 1998 using the name Tradiant. The company branded as GT Nexus in 2001 and purchased Tradecard in 2013. With revenues estimated at \$150 million, this transaction has a 4-5X multiple.

In the supply chain management technology market, historically, Infor is a market consolidator, buying and integrating disparate software assets and assembling them into industry solutions. The Infor ION architecture is a canonical enterprise model used to integrate disparate applications purchased by Infor over the past decade. Infor's investment in the Hook and Loop team created Ming.Li, a redesigned user experience, to improve collaboration and ease of use.



The So What? If I had a Magic Wand...

When I hung up the analyst call, I struggled with my emotions. The Infor team presented the acquisition as an opportunity to extend ERP to the value chain, to automate inter-enterprise order management and to sell more Infor solutions. I think that it could mean much, much more for the market.

Many of my Fortune 1000 global clients are struggling to automate value networks. They each have a chartered project that looks very similar. The goal is deeper analytics to sense and respond across make, source, and deliver. (Most of them have invested in both GT Nexus and other B2B solutions. There is seldom one technology used within a manufacturing company to connect B2B value networks.) The current market offers no solution.

In this post, I share what I would wish for to help my clients. If I only I had a magic wand...

I write this post in the form of an open letter to Charles Phillips, the CEO.

Charles-

I listened to your analyst call yesterday. Congratulations on Infor's acquisition of GT Nexus. The GT Nexus platform is an important supply chain asset, connecting with over 25,000 trading partners globally. While the majority of supply chains are connecting to their value networks today through spreadsheets and email, clients of the GT Nexus platform have taken an important step to automate the flows of the network through a canonical infrastructure supported by a many-to-many network.

In the industry, the GT Nexus product is the platform of choice for ocean visibility. With the larger ocean carriers and port congestion, GT Nexus becomes more and more important to retail and manufacturing companies. It is clear. GT Nexus is one of the strongest providers of transportation visibility for the global ecosystem. There is little functionality overlap between GT Nexus and the other B2B network providers like E2open, Elemica, GHX, NeoGrid and SupplyOn. This is good news for you and defines the greater opportunity. Based on the research that we have done at Supply Chain Insights, I feel the greater opportunity is three-fold. If I had a magic wand, these are the areas I would like for you to attack:

1) Create a Network of Networks. By definition, ERP infrastructure is inside-out. The movement of data in ERP technologies is from the enterprise out. Value networks synchronize outside-in flows, using many-to-many architectures (supporting flows from many companies to many companies as opposed to point-to-point interaction).

ERP technologies are rigid and inflexible. Figuratively speaking, supply chain leaders feel that they have been ERPed to

death. Maintenance upgrades, high costs of customization, and the inability to get data are problematic. The work with GT Nexus with many-to-many data flows could help you create true outside-in process flows for the value chain. It could give you a vehicle to redefine the company to rise above the declining market valuation for ERP solutions.

As shown in Figure 1, the gaps in inter-enterprise visibility are large. Companies have automated the enterprise, but the automation of the value chain offers great opportunities. This is the opportunity.

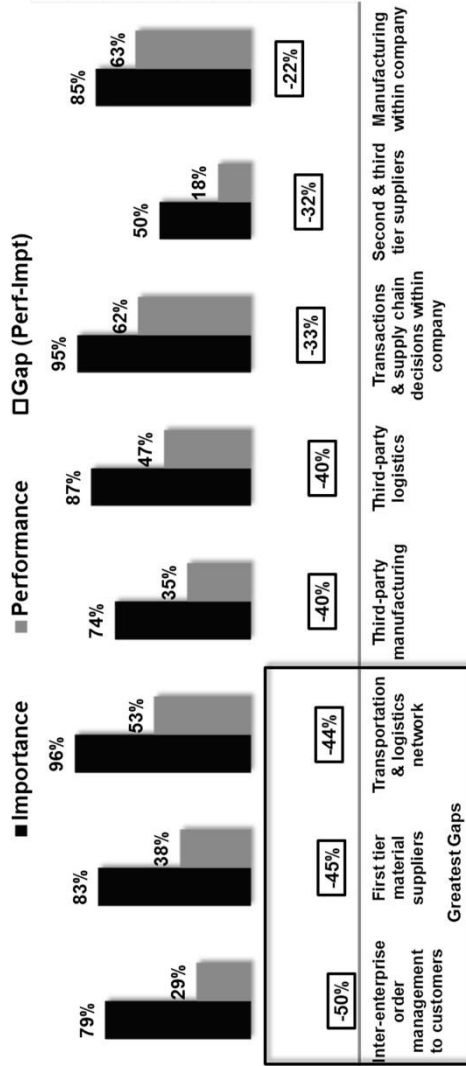
In your spare time, examine the market opportunity more closely. There is a great market for a holistic solution on supply chain visibility. Historically, our approaches have been too limited in scope and definition.

While many will compare you to SAP, it is not a comparison. SAP purchased Ariba in 2012 for \$4.2 billion, and the company has been slow to actualize the asset and drive incremental revenue. I am not surprised. The Ariba infrastructure is so heavily entrenched in indirect procurement processes that it is hard to adapt to the solution to manage direct materials in the supply chain. With the GT Nexus acquisition, you have a leg up with a fully functioning solution that is operating with direct material shipments. Now is your time to strike to build a network of networks.

What would this look like? Interoperability between GT Nexus and the other B2B networks is the goal. I would like for you to not look at these other players as competitors. Why? We have a market of niche solutions. Most companies use multiple B2B networks because they have evolved to serve a part of a supply chain—source, make or deliver within an industry—versus a value chain solution that can connect industries.

Figure 1. Current State of Network Visibility

Supply Chain Visibility: Importance vs. Performance
(Rated 5-7 on 7-point scale)



Source: Supply Chain Insights LLC, Supply Chain Visibility Study (Oct 2013- Jan 2014)

Base: Manufacturers, Retailers, Wholesalers / Distributors / Co-operatives and Third Party Logistics Providers - Total (n=78)

Q13: Please think about supply chain visibility. How important is it for your company to have visibility of the supply chain in each of the following areas? SCALE: 1=Not at all important, 7=Extremely important

Q16: How well do you think your company performs on having supply chain visibility in each of these same areas? SCALE: 1=Poor, 7=Excellent

To capture the opportunity, if I waved my magic wand, I would like to see you drive the evolution of an integration standard to enable the GT Nexus platform to become the network infrastructure for all supply chain networks. The value chain needs a solution that enables a network of networks with seamless interoperability.

2) Advanced Analytics. Most of the analytics today in B2B networks are descriptive, and operate with a latency of days and hours. The traditional EDI approach inserts a day of latency to open and read documents. Value networks need data more quickly and with greater insights. The opportunity is to deepen both the analytics and the capability for GT Nexus to use real-time information and drive higher levels of decision support. Let's first examine the opportunity to deepen analytics.

The continuum of analytics runs from descriptive to cognitive. Google and many iPhone applications today offer prescriptive analytics for traffic routing and driving for the consumer market, but there are few examples in the supply chain technology industry for the use of prescriptive and cognitive computing. Instead, most of the analytics are descriptive, enabling visualization with no contextual insights. Predictive analytics using optimization helps companies to see better alternatives, but companies need prescriptive analytics to drive insights and recommendations. And, to take it a step further, cognitive computing—learning systems to test and learn and adapt over time—would drive even greater insights.

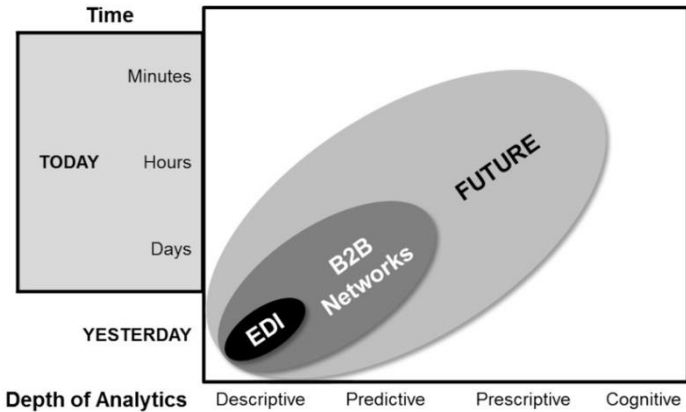
To accomplish the goal, technology companies need to embrace the variety of data types. While ERP and current enterprise systems are transactional systems based on a rational database structure, capturing the market opportunity requires a focus on deeper math and rules-based engines, based on structured and

unstructured data together. Unstructured data types like geo-spatial maps, weather patterns, digital images, warranty information, call-center logs, quality reports and contract document information are not used today.

It is the opportunity. Build new systems for supply chain visibility, using structured and unstructured data, to drive learning systems that can allow the network to test, adapt, and learn.

EDI and early forms of B2B networks define the current state depicted in Figure 2. You have the opportunity to redefine the solution and accelerate a new era of application.

Figure 2. Current State



3) Benchmark Data and Early Alerting.

There is also an opportunity for the automated benchmarking and the use of a B2B network as a syndicated data feed. Companies need a real-time data source on performance. With a sensing layer placed on the network, you can sense and share important performance data

So, Charles, in conclusion, I think a great opportunity lies before you. My advice? Don't stop with the automation of orders, or the extension of ERP. Your customers have limited op-

tions today. Functionally defined definitions from the past decade dictate architecture design. It is not what the customer needs. The functional applications of Customer Relationship Management and Supplier Relationship Management are not the right adapters, or connectors, of the enterprise to the larger value network.

It is an opportunity to define value-chain architectures which can work. As a result, I would love to see you use this acquisition to capture a larger technology market opportunity. While you can enrich the functionality by adding prediction and interoperability, you will destroy the value of GT Nexus if you try to make it the platform to extend Infor. Good luck in your journey. Let me know how I can help.

Congratulations and Good Luck!

The Shaman

Companies are seeking B2B solutions that offer interoperability and depth of analytics. They need a new and deeper capability for supply chain visibility. The race is on to enable the network of networks. Infor, with the acquisition of GT Nexus, has a powerful asset to deliver against the promise. The question is, “Will they succeed?”

There is no clear answer.

If Only I Could See Past the Firewall

Supply Chain Operating Networks: The building of supply chain applications using many-to-many architectures to connect multiple parties to multiple trading partners to improve multi-tier supply chain visibility, planning and execution to improve relationships in extended value chains.

The winds of a recession are whipping. Trade winds are changing. Globalization and localization are happening simultaneously. Growth has slowed and customers are more fickle. Yet, the supply chain organization cannot see. The supply chain is safely tucked behind the firewall operating on data that is late and out of sync with the market.

My time on the European continent is busy. I am struggling with jet lag. Last Thursday, I flew to Munich to meet with SupplyOn. The company is a B2B Supply Chain Operating Network supporting automotive and aerospace industries. I like the SupplyOn functionality; and with great references, I wanted to know more. My goal of the trip was to gain new insights.

Today and Friday, I met with large European consulting firms. Each are pushing very functional visions of the future under the guise of the digital enterprise. Each sees supply chain as a function within a functional enterprise. The vision of the extended effective value network from the customer's customer to the supplier's supplier is lost. The lack of vision saddens me.

The large consulting partners are reeling looking for significance with the downturn of the ERP market. Each has a bench of ERP consultants and they are seeking the next new thing. They are also struggling with internal politics. With strong Indian outsourcing capabilities, they are pushing the automation of processes through labor arbitrage strategies for cheap labor for manual data manipulation. They are not driving new insights through the automation of the burgeoning opportunities with new data types and technologies that enable streaming data and cognitive learning. Sadly, I find each to have a limited view of supply chain analytics.

BPO concepts limits their thinking.

An Old Gal on a Mission

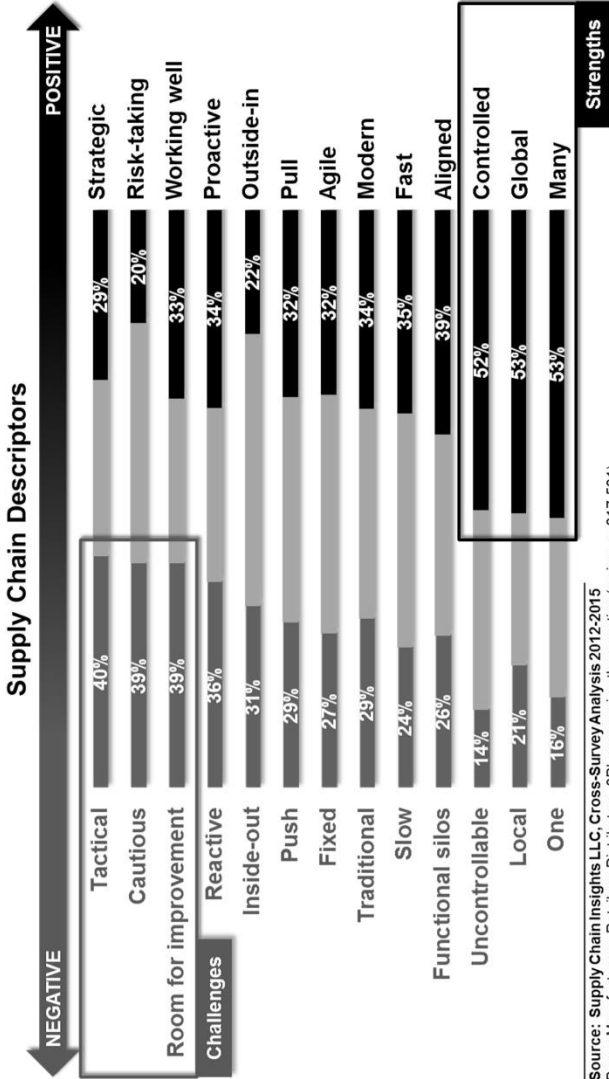


I am on a mission to spark a new discussion to evolve supply chain concepts. In the next three months, I will speak at over 20 events. The majority of manufacturing and retail companies want better performing supply chains. The desire and focus are to drive alignment, proactive processes and agility. The current state is reactive, slow and inside-out. The vision of the tightly integrated efficient supply chain has failed. The statement of, "*Doing the same thing over and over and expecting new and different results is insanity*" is attributed to both Franklin and Einstein, but I think is relevant to this discussion.

Current State

Today, the supply chain is evolving into a value network. Companies are more dependent on third-party relationships. However, automation enables enterprise efficiency not value network effectiveness. Most companies cannot see beyond their firewalls. I feel that it is time to rewire our supply chain thinking. This does not happen through conventional thinking. Instead, it happens through the adoption of new technologies and outside-in thinking.

Figure 1. Current State of Supply Chains



Source: Supply Chain Insights LLC, Cross-Survey Analysis 2012-2015

Base: Manufacturers, Retailers, Distributors, 3PLs answering the question (varies, n=317,581)

For each of the following pairs of words, please pick the one word or phrase that best describes your company's supply chain today.

SCALE: 5-point scale with one word on either end.

In our research, discrete industries—aerospace, automotive, hi-tech, and semiconductor—rate themselves as performing better, being more proactive and having greater alignment. They are more mature on supply chain visibility. Process industry leaders—chemical, consumer packaged goods, food/beverage—have greater issues using data, with software usability, and building effective connections to align and build effective relationships with trading partners. Is it a coincidence that process industry leaders have standardized on SAP and blindly followed the SAP IT-centric definition of supply chain automation without holding SAP accountable to build effective supply chain solutions for the extended value network? I will let you draw your own conclusions. My view is that both SAP and the large consulting organizations perpetuate a very functional view of supply chain management which is detrimental to building effective value networks. Since most companies invested in the automation of the enterprise not the value network, visibility within the company and the transportation network is a strength.

However, visibility of channel relationships—customer orders and consumption/purchase—in the demand network or the use and consumption of materials in the extended supplier network is an ongoing issue. Consequently, the supply chain is out-of-step with the market. The processes are largely batch using data with great latency (orders and purchase orders).

We have automated the enterprise, but not the network. As a result, we have induced and exaggerated the bullwhip effect in the value chain: there is great waste and opportunity for automation of effective value networks (see Figure 2).

Table 1. State of Industries

Characteristics by Industry

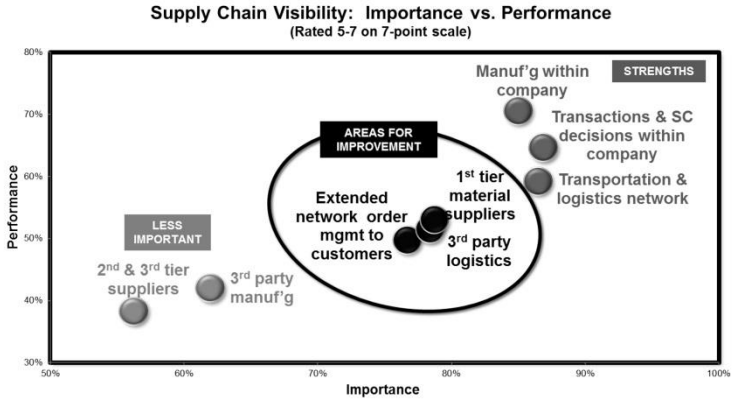
Area	Item	Discrete A	Process B
Supply Chain Visibility: Strong Performance*	Extended network order management to customers	64%B	46%
	Second/third tier suppliers	49%B	35%
Other Performance*	IT is able to meet line-of-business needs	47%	46%
	Have an effective S&OP	42%	46%
	Have an agile supply chain	39%	38%
	Is able to manage supply chain talent better than peers	24%	19%
Supply Chain Descriptors**	Room for improvement (vs. working well)	50%B	34%
	Reactive (vs. proactive)	44%B	34%
	Functional silos (vs. aligned)	33%B	24%
Top Five Elements of Business Pain	Product quality & supplier reliability	40%B	18%
	Ability to use/access data	31%	39%A
	Supply chain visibility	35%	43%A
	Clarity of business strategy	20%	26%A
	Software usability	11%	20%A

Source: Supply Chain Insights LLC. Cross-Survey Analysis 2012-2015

Base: Manufacturers, Retailers, Distributors, 3PLs answering the question – Discrete (varies, n=72-640), Process (varies, n=98-660)

*Performance measured by those rating it "high" (5-7 on 7-point scale), **Rated 1-2 or 4-5 on 5-point scale, **AB Higher than other group at 90% or higher level of confidence

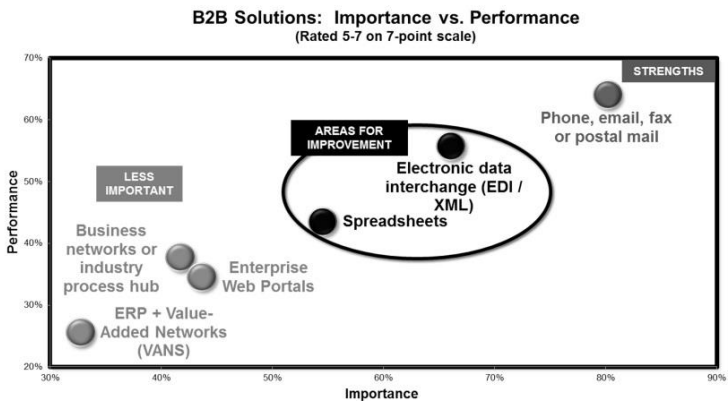
Figure 2. Current State of Supply Chain Network Visibility



Source: Supply Chain Insights LLC, Cross-Survey Analysis 2012-2015
 Base: Manufacturers, Retailers, Distributors, 3PLs answering the question – Area is applicable, varies (n=252-259)
 Please think about supply chain visibility. How important is it for your company to have visibility of the supply chain in each of the following areas?
 How well do you think your company performs on having supply chain visibility in each of these same areas?

How sad of a statement is Figure 3? Despite two decades of investment in enterprise solutions, companies today are only good at email, fax or postal mail, but not in the automation of the extended network. Let's say this again. Good at email? Spreadsheets? How sad is this?

Figure 3. Current State of B2B Connectivity



Source: Supply Chain Insights LLC, Cross-Survey Analysis 2012-2015
 Base: Manufacturers, Retailers, Distributors, 3PLs answering the question – Use solution (65-116)
 For each of the B2B solutions that your company uses below, please indicate how important it is to your company.
 And for these same B2B solutions, please rate its performance for your company.

Many companies that have depended on the extension of ERP architectures to build value networks are dependent on ERP messaging and portals, but this form of B2B automation lacks bidirectional communication and an inter-enterprise system of record. Let me explain the issue. Macy's is under market attack. They are pushing back on suppliers. It is a brutal environment. The changes for supplier trade are ever-changing with greater punitive implications. However, Macy's communicates to suppliers through portals. The information changes daily. As a result, without a persistence layer, it is tough for suppliers to work through issues and track needs. Macy's feels good about their portal strategy, but it is ineffective for supplier coordination. As a result, out-of-stocks reign and supplier teams spend endless hours debating deductions.

Let me give you another example, I was speaking to a supplier critical to delivering materials to the Caterpillar heavy loader division last week. The supplier commented that it was impossible to know what Caterpillar needs for direct materials requirements at their factories. Why? They get over 5000 spreadsheets daily with each plant changing the requirements multiple times a day. The issue? There is no system of record with bidirectional agreements on supply.

Strong value networks and strong relationships go hand-in-hand. In the building of global supply chains, in the last decade, across value networks, outsourcing to third-party logistics, and contract manufacturing accelerated. While the leaders that forged these relationships promised innovation and acceleration of B2B networks, what happened was quite different.

As shown in Table 2, the contract manufacturing industry is a weak model, and a risk for the hi-tech value chain. In the building of the contract manufacturing model, brand owners in the hi-tech value chain pushed cost and waste backward into the value network creating issues with fair labor and social responsibility.

They did not automate the value network or take ownership for their demand signal. The low margins, the transactional nature of the relationships, and the lack of innovation is a barrier for the hi-tech value network to move forward. The process industry's reliance on the 3PL transportation model is a similar dilemma.

Why Did We Not Evolve Value Networks in the Last Decade?

There are many reasons, let's start with the investments in technology. In the period of 2000-2005, the trading exchange model was over-hyped, and the software largely under-delivered against the business goals. In the heyday, there were more than 80 trading exchange solutions. In 2000-2002, I used to get a press release weekly on the launch of new B2B network models. i2 Technologies marketed industry-specific solutions under the brand TradeMatrix that were largely hype; but in this period, industry consortia evolved to push industry-specific applications. The concept was that supply chain leaders could collaborate within an industry to deliver B2B capabilities for trade. Procter & Gamble led an initiative for Transora. The solution implemented by PWC failed.

Table 2. A Critical Review of the Contract Manufacturing Model

Performance and Improvement: Contract Manufacturers

Company	Growth				Operating Margin				Inventory Turns				Return on Invested Capital				Revenue/Employee (\$K)				Supply Chain Index Rankings*				
	2006-2014	2009-2014	2011-2014	2014	2006-2014	2009-2014	2011-2014	2014	2006-2014	2009-2014	2011-2014	2014	2006-2014	2009-2014	2011-2014	2014	2006-2014	2009-2014	2011-2014	2014	2006-2014	2009-2014	2011-2014	2014	
Benchmark Electronics	0.03	0.02	0.04	0.04	0.02	0.03	0.03	0.03	7	7	7	7	4%	6%	6%	6%	251	236	242	2	5				
Celestica	-0.04	-0.04	-0.03		0.01	0.02	0.02	0.02	8	8	8	8	2%	8%	10%		205	211	225	2	1				
Flextronics	0.08	0.00	-0.03		-0.01	-0.02	-0.02	-0.02	9	8	8	8	-4%	-6%	-10%		172	168	-167	2	3				
Jabil Circuit	0.09	0.04	0.05		0.01	0.01	0.03		8	8	8	8	3%	2%	10%		165	152	177	5	3				
Kimball International	0.03	-0.01	0.04		0.01	0.02	0.02		9	9	9	9	4%	4%	4%		180	187	189	1	2				
Average	0.04	0.00	0.01		0.01	0.01	0.02		8	8	8	8	2%	3%	4%		194	191	133	4%	NA	NA	NA	NA	NA

Supply Chain Insights LLC – Derived from YCharts; *Supply Chain Index Rank = Based on average ranking within industry of Balance (Return on Invested Capital & Revenue Growth Vector Trajectory), Strength (Inventory Turns & Operating Margin Vector Trajectory) and Resiliency (Inventory Turns & Operating Margin Mean Distance)

During the initial round of funding, 49 leading consumer products companies—The Coca-Cola Company, Diageo PLC, The Earthgrains Company, Kraft Foods, Inc., The Procter & Gamble Company, Sara Lee Corporation, and Unilever, NV—contributed more than \$250 million to fund Transora. The solution failed. In automotive, Covisint—established by American automotive manufacturers of General Motors, Ford and DaimlerChrysler—formed. In 2004, Compuware purchased Covisint.

Today, the company has changed the model and now focuses on OnStar automation and the Internet of Things. Similarly, the Worldwide Retail Exchange (WWRE) sold to Neogrid in 2012. I could go on and list many more industry consortia exchange models that failed, but I will not bore you. Today, the Supply Chain Operating Networks, funded by consortia investment, remaining are GHX, Exostar, E2open, Elemica and SupplyOn. Hence my interest to understand what drove success in the building of the business models of the trading exchanges that are evolving in Supply Chain Operating Networks.

My first take? I think it is a story of leadership. Dell drove the E2open model. Airbus, Bosch and Siemens adopted and evolved the SupplyOn model. Elemica strategies—driven by the rubber manufacturers and BASF—were more successful. I could go on and on. My second belief is that there are too few business leaders. Prove me wrong. This is my mission.

I firmly believe that the concept of Supply Chain Operating Networks (a model that connects many partners to many partners) makes sense and is the future backbone of the connected value network. However, it is also clear to me that we

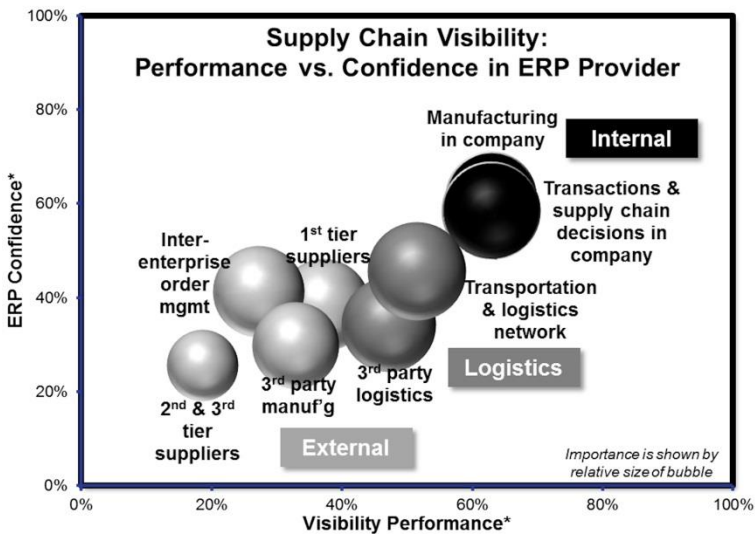
have had lots of starts and stops, and few successes. I want to learn why. My goal is to help business leaders sidestep the issues.

Recommendations?

Lesson #1

My first learning is that we have a blind loyalty and belief in ERP as the enabler for the extended value chain. There have been too few leaders. The Gartner vision for ERP II in 2002 was destructive.

Figure 4. Confidence in ERP to Drive B2B Connectivity



Source: Supply Chain Insights LLC, Supply Chain Visibility Study (Oct 2013- Jan 2014)
 Base: Manufacturers, Retailers, Wholesalers / Distributors / Co-operatives and Third Party Logistics Providers – Have ERP System (n=70); *All measures based on those rating 5-7 on a 7-point scale Q15. Please think about supply chain visibility. How important is it for your company to have visibility of the supply chain in each of the following areas? SCALE: 1=Not at all important, 7=Extremely important; Q16. How well do you think your company performs on having supply chain visibility in each of these same areas? SCALE: 1=Poor, 7=Excellent; Q17. How confident are you that your ERP provider can give your company the supply chain visibility it needs in these same areas we asked about before? SCALE: 1=Not at all confident, 7=Very confident

As shown in Figure 4, despite the fact that supply chain leaders do not believe that ERP extensions will automate the

value chain, they struggle to fight the ERP consolidation momentum within the enterprise led by the CIO and the CFO. The limited vision of the system integrators perpetuates the belief in ERP as the backbone for the extended value chain. We need to step back and fight this vision and invest in emerging Supply Chain Operating Networks. Traditional APS and ERP are enterprise data models and lack multi-tier capabilities. Don't confuse the two.

For example, as much as Kinaxis talks about the building of value networks and a control-tower vision, Kinaxis is an enterprise data model automating one-to-one and not one-to-many or many-to-many value networks. In contrast, E2open is a Supply Chain Operating Network.

Lesson #2. Lack of Adaptors for the Extended Value Chain.

The enterprise definitions of CRM and SRM do not enable the natural connection of value networks. To drive success in value networks, build multi-tier capabilities in channel and sourcing relationships side-stepping the use of both traditional CRM and SRM concepts.

Lesson #3. Build Strong Relationships in the Value Network.

Own the network and build win-win relationships. We have spent the last decade building win/lose transactional data models. Supplier viability is an issue, and currently companies give lip service to social responsibility. (Over 90% of companies have a social responsibility statement, more than 70% have marketing claims on managing social issues (recycled, lower energy, less waste), but only 22% of companies are automating and owning the value network where there is consumption of 65% of non-renewable resources). Change the

dynamic by owning the value network and automating bi-directional flows and enabling systems of record between trading partners. Make the world a better place. Reduce risk. Don't just talk about reducing risk and improving collaboration. It starts with defining win/win business model and automating network flows. It is time to act. Just do it!

Insights on Building a Customer-Centric Supply Chain

‘Chin Music’ Definition: Idle Chatter, Idle Talk or Vague Explanations - Urban Dictionary

In my work as a supply chain analyst, and Founder of Supply Chain Insights, I attend many supply chain conferences. On a day like today, when I am struggling with jet lag and recovering from sleep deprivation, I tell my friends that I attend more conferences than I would like to attend. However, when I am well-rested and in a better state of mind, I remind myself that supply chain conferences are a great way to connect with people in a meaningful way. I treasure the dialogue and the connections. This is true even though it is a

wicked toll on my body. (The impact of late planes with rain delays and a midnight arrival is slowly dissipating as I write this article.)

Customer segmentation, and building a customer-centric supply chain, is a popular topic at conferences. When I sit through sessions on building a customer-centric supply chain, I am looking for case studies on how companies have applied the concepts to drive greater value. The words from the speakers sound good. The audience interest is high. However, I usually leave the room disappointed. Why? The explanations are vague and largely not implementable. “Chin music,” I mutter, as I hear hollow words without concrete advice. To help, and to start a more meaningful dialogue, in this blog post I share my thoughts on building a customer-centric supply chain organization.

Reflections

My insights on the topic are now a decade old. In the fall of 2008 I attended a major consumer packaged goods company’s global customer team meeting. The topic was “Customer First.” Excited to attend, I volunteered for the assignment. Few companies have global customer councils. When I showed up as a speaker my first red flag was there was no sales or marketing representation in the room. My second signal was that the group was not clear on who was their customer.

As the session progressed it became clear to me that the leader’s vision was to do whatever the customer wanted, when they wanted it, at whatever cost. (Sales-driven and customer-driven concepts are often wrongfully used interchangeably. They are distinctly different.) It was a very regional, sales-

driven culture, and there was no clarity between a sales request and a customer requirement. As the session progressed I became very uncomfortable. Why? The organization had intense pressure from their financial team on costs, their customer service (on-time delivery and case fill) was unreliable, and the supply chain systems were not designed to manage one-off customer requests.

The First Step in Building the Customer-Centric Supply Chain Is Reliability

A frequent mistake on the journey is selecting the starting point. I am firmly convinced that the first step in the delivery of a customer-centric supply chain is reliability. A supply chain that cannot fulfill promises will never get high marks for customer service. Let me illustrate why with a story.

A month after completing this strategy session I was doing a series of strategy days with two chemical companies in Houston. They were competitors. (The names are not shared due to NDA restrictions.) When it came to shipments, one company (Company A) did whatever the customer requested, while the second company (Company B) held the customer to the contractual requirements. Company B, not Company A, won the award for the most valuable supplier of the year. Company B, not Company A, had the lowest costs. This may sound illogical, but simply put, if a supply chain promises to deliver many “one-off requests” and cannot deliver, it is worse than ever saying “Yes” at all.

Company A got all the rush shipments and one-off requests while Company B delivered reliably during normal cycles and charged a higher rate for one-off hot-shot and team shipments. Reliability matters. In my work with supply

chain leaders I am firmly convinced that the leader must start the customer-centric journey with a focus on reliability and then execute the outside-in customer segmentation strategy.

The Second Step Is Understanding the Customer. Map the Supply Chain from the Customer/Channel Back.

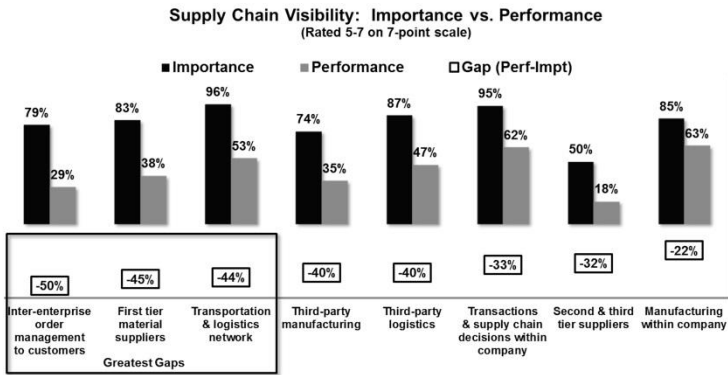
Unfortunately, our inside-out enterprise architectures constrict the flow of customer data to the supply chain organization. In the words of a supply chain leader that I had lunch with yesterday, “The pipes of the organization from the customer to the supply chain are constricted. It is hard to get good information on the customer.” What do I mean by mapping customer processes? Here we share seven places to start.

1 - An Order Is Not an Order. A Customer Is Not a Customer. Visibility Is Key.

In Figure 1, I share recent research on supply chain visibility. Channel visibility is an issue for most supply chain leaders. An order is not an order. A customer is not a customer. However the differences are not clear in today’s normal technology implementation. An order has many types: a rush order, a turn order, new product launch fulfillment, a special order, or a sales order to stuff the channel to fulfill a sales bonus target. Each should have a different priority; but, it is hard to have an operational discussion without visibility.

Improving order visibility to enable action is one of the first steps to improving reliability.

Figure 1. Current State of Supply Chain Visibility



Source: Supply Chain Insights LLC, Supply Chain Visibility Study (Oct 2013- Jan 2014)
 Base: Manufacturers, Retailers, Wholesalers / Distributors / Co-operatives and Third Party Logistics Providers – Total (n=78)
 Q15. Please think about supply chain visibility. How important is it for your company to have visibility of the supply chain in each of the following areas? SCALE: 1=Not at all important, 7=Extremely important
 Q16. How well do you think your company performs on having supply chain visibility in each of these same areas? SCALE: 1=Poor, 7=Excellent

2 - Define What Matters to the Customer. Align the Organization on the Tension between Special Requests versus Delivery Reliability.

Sales teams are incented on volume. In contrast, the supply chain team is typically incented on costs. The two organizations do not naturally align.

One-off campaigns add to supply chain complexity. The greater the complexity of the campaign, the greater the challenge to deliver reliability. The dilemma is how to manage through the issue. Many supply chain leaders feel like they are in the vice-grips of special requests. If the supply chain leader consistently turns down “special requests,” the organization sees the supply chain group as always saying “No” in the face of the need for volume growth. Being “Dr. No,” and seen as an obstacle to overcome, is problematic. It is less than career enhancing.

How to get around the issue? Don’t hit this political issue head first. Instead, go outside-in and learn from the customer. Complete a customer assessment to understand the im-

portance of one-off campaigns versus delivery reliability. After the assessment, try to focus groups cross-functionally on what really matters to the customer. Facilitate a clear understanding of the choice between responding to customer requests versus sales programs. Then execute a program on what really matters to a customer.

On this journey you will clearly see customer segments—industries you serve, the size of customers, regions/geographies—have different requirements and expectations. Try to define customer service policies around these “need states.” Examples are lead times, minimum order quantities, type of delivery service, return policies, and ASN documentation. In the definition of policies, think creatively about incenting the customer for good behavior. Here are some examples I have encountered:

- **Data Sharing.** A major food company gives discount pricing for data sharing by retailers. The greater the frequency and data granularity, the deeper the discount.
- **Forecast Accuracy.** A contract manufacturer shares discount pricing based on forecast accuracy of the customer. Forecast accuracy, and compliance to the projected order pulls, is the basis for pricing.
- **Shipping Standards.** A major consumer packaged goods company gives discounts for full trucks, even layers, and preferential timing for dock door acceptance. Others provide discounts for slip sheets to avoid the hassle of pallets.
- **Pay-on-Performance Promotions.** “Pay for performance” promotions, or gain sharing, in the execution of trade promotions drives pricing.

- **Hands-Free Orders.** A discount is given if the order can flow hands-free with no touches.

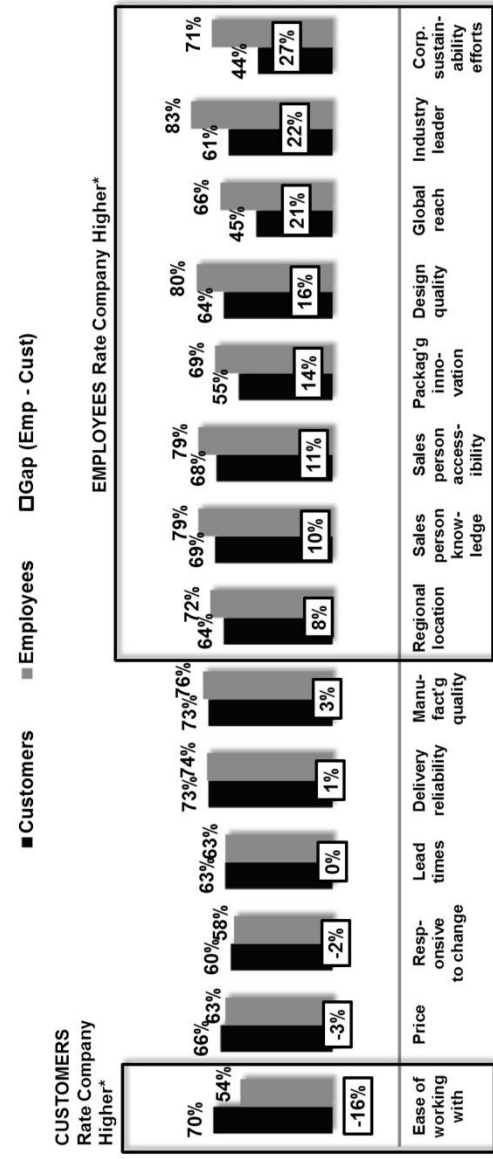
To help companies with ISO 9001 compliance, and what matters to the customer, we have been doing customer assessments and comparing the voice of the customer to internal belief structures. An example, shown in Figure 2, demonstrates the differences between the internal views of the supply chain teams and the customer. (If interested in doing this type of survey, check out our capabilities on the Supply Chain Insights website.)

3 - Use Scorecards Cross-Functionally.

Scorecards are a valuable piece of customer information. In our research on scorecard usage, we find 2/3 of suppliers actively review scorecard results cross-functionally. It is a mistake to hold the scorecard within the sales or commercial organizations.

When I review scorecards I find it useful to keep the key elements of Figure 3 in mind. Why? In consumer products, despite two decades of retail scorecard sharing, we have only improved on-time delivery and shipment conformance. Companies still have a long way to go in resolving billing/deductions, providing excitement in assortment, and reducing costs. Like retail, in most industries the scorecards are a great starting point for a discussion and yield great input, but do not give teams a complete answer.

Fig 2. Customer Satisfaction by Supplier (Customer vs. Supplier) and Employee Satisfaction (Employee vs. Supplier)



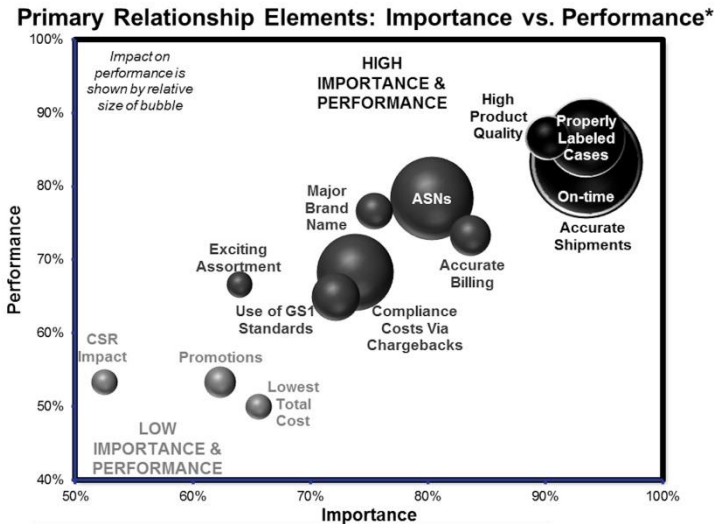
Source: Supply Chain Insights LLC, Customer Satisfaction Study

Base: Customers (n=437), Employees (n=542)

Q25: How well do you believe [INSERT SUPPLIER] performs on each of the following? Q14: Please think about [INSERT COMPANY]. How well does [INSERT COMPANY] perform on each of these same factors?

SCALE: 1=Poor, 7=Excellent, 0=Don't know, *Showing those rating 5-7 on 7-point scale, □ *Higher than other group at 90% or higher level of confidence

Figure 3. Current State of Retail Scorecards



Source: Supply Chain Insights LLC, Retail Scorecards Study (Jan – May 2014)

Base: Suppliers/Manufacturers and Retailers Who Work with Retail Scorecards (where retailer evaluates supplier) (n=61)
 Q16. When you think about your primary [supplier][retailer] relationship, how important is each of the elements listed below? SCALE: 1=Not at all important, 7=Extremely important (Rated 5-7 on 7-point scale); Q17. How would you rate your primary [supplier][retailer] relationship on each of these same areas? SCALE: 1=Poor, 7=Excellent (Rated 5-7 on 7-point scale); Q18. Please pick the 3 areas where scorecards have had the greatest positive impact on the your primary [supplier's][retailer's] performance. Please pick no more than three.

*Rated 5-7 on 7-point scale

While scorecards are useful, they are not sufficient. A more complete answer to manage/implement a customer-centric supply chain is mapping the processes outside-in, and gaining/using customer insight to drive supply chain design and policy development.

4 - Implement Cost-to-Serve Analysis to Drive Actionable Results.

An effective way to align commercial and operational teams is the implementation of cost-to-serve analysis. I firmly believe that the successful implementation of cost-to-serve analysis is one of the reasons for L’Oreal’s improvement.

What is cost-to-serve analysis? It is the analysis of supply chain cost drivers by customer.

An example, as shown in Figure 4, demonstrates that the elements of supply chain costs vary widely by customer. In the evaluation and alignment of these cost differences teams can align and start to build the framework for a customer-centric supply chain.

The implementation of a cost-to-serve analysis in conjunction with a Sales and Operations planning effort improves sales and operational alignment and helps to balance one-off programs with customer needs.

5 - Get Good at Available-To-Promise (ATP).

ATP is an important element in ensuring reliability in customer shipments. It sets the expectation on product arrival with the customer. As the organization grows, and covers more geographies, a good ATP signal becomes more critical.

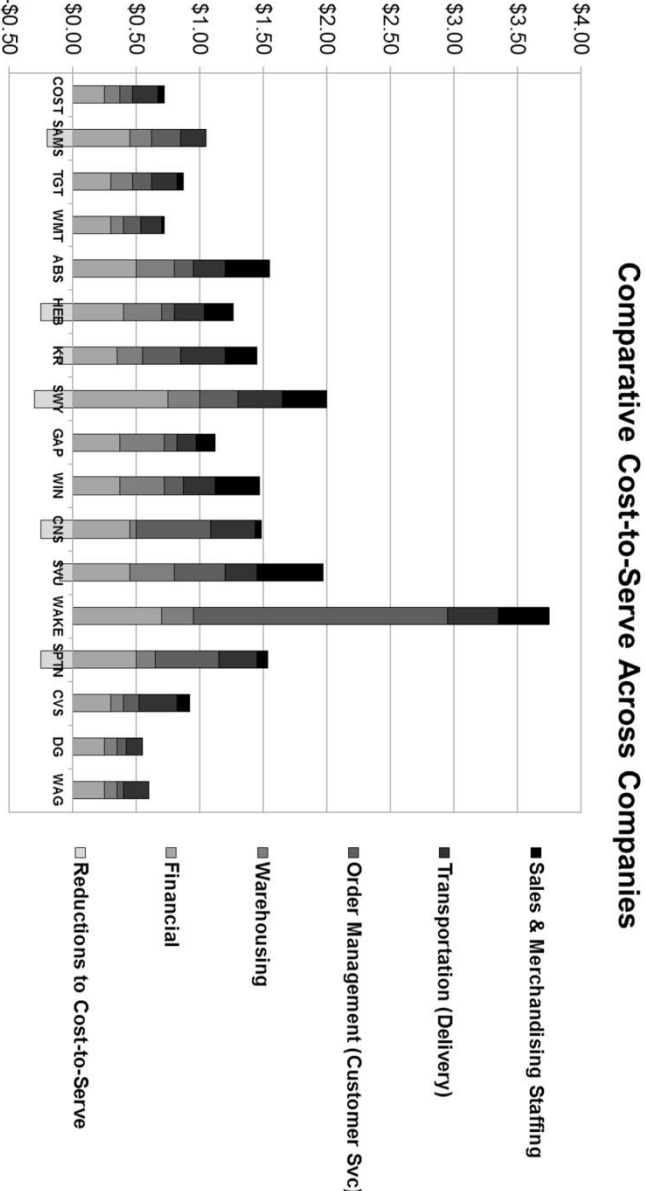
To understand reliability compare the ATP given on an order to actual performance and chart the reason codes for deviations.

6 - Establish Listening Posts.

Social data, rating and review data, warranty data, customer comment data, and distributor data comes to the organization but is not used by most supply chain leaders. The design and use of listening posts—to mine and use unstructured data—helps in market sensing for new products and channel programs.

While the techniques to use Sentiment Analytics are new, they are very promising. Anthony Volpe shared a great presentation on this topic at our recent conference. Reference our recent work with Lenovo to gain an understanding of how this approach can help you.

Figure 4. An Example of a Cost-To-Serve Analysis



7 - Recognize the Differences in Supply Chains and Design Buffers.

Within a company there are usually 5-7 supply chains with distinctly different rhythms and cycles. In the mapping of these differences use supply chain design technologies. This analysis will use the cost-to-serve data as an input and will evolve over time into customer-centric supply chain policies.

In this process use customer data; however, in this process, trust, but verify. What do I mean? Don't use customer data blindly. For example, use customer forecasts only when you understand the error and bias. As companies mature, network design activities using customer data becomes a monthly process.

I hope as you read this blog post that you believe these seven points are more than just "chin music." Building a customer-centric supply chain happens through hard work, understanding what matters by customer segment, and building customer-centric policies. We want to help. Let us know your thoughts. We would love to continue the discussion in the Beet Fusion community.

What is Beet Fusion? Beet Fusion is a community designed for supply chain leaders around the world to have healthy conversations on the evolution of supply chain practices. Our goal is to make it the Facebook, LinkedIn, Yelp, and Monster for the supply chain community. Feel free to post jobs in the community, engage in a discussion, or add content. We hope to see you there. Visit the community at www.beetfusion.com.

Is Inventory Waste or an Asset?



I am sitting in seat 4E on an evening flight to San Francisco thinking about my day. It is Labor Day weekend in the United States, and the plane is full. While many have a three-day holiday this weekend, I will celebrate this Labor Day by working.

Next week is the annual Supply Chain Insights Global Summit, and Summit preparation is on my agenda for the weekend. At the Summit it will be great to network with old

friends, and share insights, but there will be no play for me this weekend.

In the preparation phase for the Summit, I schedule planning calls with the speakers and panelists. This is a series of preparation calls. This morning, I unexpectedly found myself in the middle of a debate between my two panelists on the Planning Benchmarking panel for the Summit. We were discussing the results of the planning benchmarking work that we have just finished, and I was sharing some insights on inventory management when one of the panelists emphatically stated, *"Inventory is a waste to manage. We feel so strongly about this that we do not have an inventory planning role."* The other panelist retorted disagreement. His feeling was that inventory is an asset to manage. A heated debate ensued. The answer, I feel, is that "it depends." Inventory is both. Companies need to carefully manage the asset and mitigate the waste. The successful answer depends on supply chain strategy and the building of strong processes to manage supply. Each company is different. Planning is not planning.

My Insights

While I agree that companies need to right-size inventory to maximize ROIC and improve customer service, there are many underlying decisions that I feel many companies do not make consciously. The goal is to become consciously competent in managing the role of inventory in supply chain strategy.

Inventory management is a complex subject. Recently, through my analysis of the planning benchmarking work, I have become fascinated with the role of inventory in the market-driven value network. Before the benchmarking work, I

believed companies that were better forecasters would be better at inventory management. This is no longer my belief. Let me tell you why:

- **Shifts in the Form and Function of Inventory.** While forecast accuracy, if used well, can reduce safety stock, what I find in the study of the global multinational is the rise of cycle stock due to increased item complexity, and the increase of in-transit inventories due to longer freight lanes and longer cycles in ocean transportation. Most supply chain leaders hear the word inventory and instantly think about safety stock management, but this is too simplistic. The management of form and function of inventory is essential to improve inventory turns in this increasingly complex world.
- **Cycle Stock is an Opportunity for Most.** Cycle stock is most effectively managed through the successful implementation of production planning. (Cycle stock is the management of stock required to cycle through production runs and procurement buys effectively. It involves complex logic on batch size, change-overs and production sequencing.) This planning technology is tricky to implement and many of the technologies are not up to the task. With many companies adding items to the product line, the management of the production rhythm wheel increases in importance. The modeling of a feasible plan including buffers and constraints is also critical.
- **Inventory Is the Most Important Supply Chain Buffer.** There are two buffers in the supply chain: inventory and manufacturing capacity. The reduction

of cost and improving asset utilization is usually the charter of the supply chain team. As assets become more and more utilized, manufacturing loses the ability to buffer volatility through manufacturing capacity optimization. In parallel, with more and more manufacturing outsourcing, companies lose the capability to buffer through the use of manufacturing capacity. As a result, inventory becomes the critical buffer to absorb demand and supply volatility.

- **Technology Cannot Help If We Don't Support It Organizationally.** More and more companies are purchasing inventory technologies, but failing to give planners time to plan. There is more and more need for an inventory planning role to manage the form and function of inventory and develop inventory strategies. Buying the technology and not having clear processes and accountability does not help. We are still in our infancy in the use of multi-tier inventory optimization technologies.
- **Rising Volatility.** Most companies are not measuring and adapting with volatility. Analyzing forecastability of the item portfolio is a good starting place. The second analysis is the measurement of the long tail of the supply chain. As items proliferate, and markets shift, the demand plan becomes more volatile. This is the case for most, but it is not recognized. Embracing demand and supply volatility is critical. Learn to dance with uncertainty.
- **Forecast Consumption Logic Is an Opportunity for All.** The variation in error at the distribution level in forecast consumption logic in the benchmarking

analysis was higher than I thought. It was shocking to this old gal. I recommend that all companies measure the MAPE of the forecast at the item level for the distribution center, and then ask themselves the question "*Why have we not implemented demand sensing to improve replenishment?*"

- **Executive Understanding.** One of the surprises for me in the benchmark data is the gap in understanding of inventory strategies by the supply chain executive team. The concepts of planning and the management of form and function of inventory are not well understood. It takes training. The strategy requires careful definition with finance. However, it is worth it. Inventory turns correlate to market capitalization.

Join the Debate...

I love an active debate and look forward to hearing your feedback on the supply chain planning benchmarking work.

Time for Value Network 4.0?

“We can see the computer age everywhere, but in the productivity statistics.” - Robert Solow, Economist, 1987

It's a lazy day for me in Singapore. I spent a jet-lagged day reading by the pool. I dragged *The Rise and Fall of American Growth* by Robert J. Gordon to the Far East and digested 700 pages of economic analysis while enjoying the sun.

I know. Admittedly, I am a geek. Reading the old-fashioned way is a joy for me.

As I closed the book, and prepared to go to bed, my mind raced. I struggle with a hard cold fact. The impact on Total Factor Productivity from the second industrial revolution—fueled primarily by two inventions the combustion engine

and electricity—stretched 50 years from 1920 to 1970. The surge in Total Factor Productivity (TFP) growth from the third industrial revolution—associated with computers and digitization was much shorter in duration lasting only ten years during the period of 1994-2005. The third industrial revolution was much shorter and smaller in impact. This resonated. Born in 1954 and a baby-boomer, I experienced both of these periods.

I read Chapter 17 in the book on the difference in productivity impact of the two industrial revolutions many, many times. It is worth the read. Gordon's reason for the difference in impact of the two industrial revolutions? His belief is that there was less follow-on innovation from the third industrial revolution. The impact of the third industrial revolution was more limiting in its effect on the sphere of human activity. The effect was primarily on office productivity and entertainment, but not on manufacturing. The period of 2004-2014 had a .4 percent TFP annualized growth rate down from 1.03 percent for the period of 1994-2004. Gordon writes, "*The problem created by the computer age is not mass unemployment, but the gradual disappearance of good, steady, middle-level jobs that have been lost not just to robots and algorithms but also to globalization and outsourcing to other countries using low wages.*"

I turned down my bed, amused by the coverage of the primary election results of South Carolina and Nevada on CNN. (Watching CNN in global travel is a bit comical.) As I watched Donald Trump take the stage and thank South Carolina and promise to make America Great Again, I thought of the work of the German government on "*Industrie 4.0.*" The vision of industry 4.0 was presented in 2013. I

thought, “at least Germany has a vision.” Six design principles form the core of the mission:

1. **Interoperability:** the ability for plant equipment (i.e. workpiece carriers, assembly stations and products), humans and Smart Factories to connect and communicate with each other via the Internet of Things and the Internet of Services
2. **Virtualization:** a virtual copy of the Smart Factory created by linking sensor data (from monitoring physical processes) with virtual plant models and simulation analytics
3. **Decentralization:** the ability of cyber-physical systems within Smart Factories to make decisions on their own
4. **Real-Time Capability:** the capability to collect and analyze data and provide the derived insights immediately
5. **Service Orientation:** offering of services (of cyber-physical systems, humans or Smart Factories) via the Internet of Services
6. **Modularity:** flexible adaptation of Smart Factories to changing requirements by replacing or expanding individual modules.

By definition, the networks and process definitions in the German vision is currently limited to a single factory, but there is recognition of the need by the committees to interconnect multiple factories across geographical regions. The focus is on building 6C systems: connection (sensors with networks), cloud (computing and data on demand), cyber (models and memory), content/context (meaning and correla-

tion), and community (sharing and collaboration and customization (personalization and value)).

Let me start by giving the Germans congratulations. Their answer to the fall in growth and decline in productivity is so much more attractive to me than United States politicians' promises.

However, I don't think even the German vision goes far enough. Globally, why is there not a vision for Supply Chain 4.0? Or better still a vision for Value Networks 4.0? For me it would enable the use of digital innovation to drive greater value in value networks. It would improve the interoperability between and among networks. The impact would be outside-in from the customer's customer to the supplier's supplier; and the signals would be real-time and bidirectional with a focus on sensing and minimizing waste.

Stuck today, nine out of ten companies struggle to improve performance at the intersection of operating margin and inventory turns. Despite a focus on projects, continuous improvement programs and functional process design, supply chain leaders are unable to drive improvement in both of these two important metrics. Corporate investments are in operational (transactional processing) and productivity systems (email and office systems). Overall, companies lag in the understanding of the potential of new forms of analytics. We are very early in our journey to define the digital supply chain and extend the concepts to building a digital, outside-in value network(s).

Let me give you some examples. Today's supply chains do not sense. They respond. The processes are largely batch and out of step with markets. Currently employees within companies hard-code master data. While supply chain leaders talk

about being customer-centric, they cannot see and use customer data. In fact, only 12% of companies can easily get to total cost data. Digital innovation has transformed the office and marketing, but not the supply chain. This is my mission.

My goal? Drive change to change the equation. Join us in making a difference.

SECTION 5

**Supply Chain Metrics
That Matter**

A Question from the Audience

This month I presented research on the Supply Chain Metrics That Matter to an audience of 500 at a logistics conference in Mexico. At the end of the presentation, the questions in Spanish came fast and furious. One from the center of the audience stuck with me. A man in his early thirties asked, *"How long does it take to make real improvement on the Supply Chain Metrics That Matter?"*

I smiled. The answer is analogous to *"How long is a man's legs?"* Everyone wants a definite question, but the answer is, *"It depends."*

My response, "The average time to see improvement is three years. However, it can take five and many do not see

improvement at all." What makes the difference? Here is my complete answer.



Background and Perspective

As I formulated the answer to the audience in my head, the flashbacks were fast and furious. In the 1990's when I worked for a software vendor and built presentations for the sales groups, I firmly believed that it was twelve-to-sixteen months. As an analyst at AMR Research and Gartner Group in the last decade, I believed that supply chain metrics improvement was possible in two-to-three years. However, in this period, I was not actively studying balance sheet information. Now, I am. In my work as the Founder of Supply Chain Insights on the Supply Chain Metrics That Matter, I can see that it is much slower, and with more issues, than I thought before. In my first decade as an analyst, I was naive.

In the past four years, at Supply Chain Insights, the team focuses on understanding the patterns and drivers of the Supply Chain Metrics That Matter. As an organization, we sit on ten years of supply chain income statement and balance sheet data for global public companies and we are constantly trian-

gulating the data and correlating the balance sheet data to quantitative research projects to understand the trends. The research is not easy. In the course of four years, we have learned a lot, but are still refining the research methodologies.

As I talk to supply chain leaders, I find many misconceptions. Surprisingly, I also find that while the majority of companies want to improve cost and inventory, only 10% of public companies are making progress on inventory and cost metrics at the same time. Few supply chain organizations recognize this fact.

The results fly in the face of conventional wisdom. Most companies feel that the supply chain is making great progress on cost, customer service and inventory. They may be making progress within a function, or project-by-project, or tracked objectives in continuous improvement programs, but it is not translating to the balance sheet and income statements.

Why is this? The supply chain is a complex system requiring holistic thinking in the management of metrics. What we see in the research is that a project may drive improvements, but it is hard for the organization to drive systemic improvements through a project-based focus. An improvement in project X may offset improvements in project Y. In a similar manner, many companies operate continuous improvement programs, and believe that they are driving great improvements on the Supply Chain Metrics That Matter, but an improvement in cost in a continuous improvement project can quickly be offset by a shift in complexity.

In the research, we find that success cannot happen through a project-based focus, a continuous improvement program-based focus or a functional metric focus. Instead, it

requires cross-functional alignment on the Supply Chain Metrics That Matter. What are the Supply Chain Metrics That Matter? These are the metrics that have the highest correlation to an objective measure of value. We use market capitalization (price of shares outstanding by the number of shares outstanding in public markets) and Price to Tangible Book Value in our research, and believe that companies should manage the metrics of growth (year-over-year revenue progress), operating margin, inventory turns, Return on Invested Capital (ROIC) and customer service (unit fill rates shipped on time).

My Answer

The fastest progress of a company happens when there is:

- **Continuity of Leadership.** Progress is faster when the leader stays in place for the journey. Leadership disruption can halt progress. For example, in the time that I have been an analyst (2000–2015), P&G has had three leaders while Dow has had nine.
- **Holistic Vision.** When the leader understands that the supply chain is a complex system with increasing complexity, the rate of progress is faster. In contrast, when the metrics are managed in isolation and complexity is allowed to proliferate unchecked, supply chain progress against the goals is slower.
- **Alignment in Reporting Relationships.** As shown in Table 1, when source, make and deliver report to the same leader, the progress is faster. There is faster progress when there is a supply chain organization that has been in existence for at least ten years.

Table 1. Characteristics of Supply Chains That Are Working Well

Characteristics of Supply Chains That Are “Working Well” vs. “Room for Improvement”*			
Area	Item	“Working Well” A	“Room for Improvement” B
Revenue	Average revenue	\$5.6 billion	\$5.3 billion
	Process	57%	48%
Industry	Discrete	27%	42%A
	Have a supply chain organization	98%B	92%
Supply Chain	Average # of functions reporting to supply chain	6.1	5.9
	Make (Manufacturing)	43%B	27%
	Supply Chain Planning (Supply)	83%	95%A
	SC leader reports to C-Level / President	68%	72%
	Supply chain visibility	41%	57%A
	Cross-functional alignment	30%	55%A
Top Five Elements of Business Pain	Increasing regulations and compliance	28%B	14%
	Product quality and supplier reliability	28%B	12%
	Executive team understanding of the supply chain	25%	38%A
	Ability to use and access data	23%	48%A
	Organizational change management	20%	38%A

Source: Supply Chain Insights LLC, Cross-Survey Analysis 2012-2015

Base: Manufacturers, Retailers, Distributors, 3PLs answering the question – Working well (varies, n=61-116), Room for improvement (varies, n=77-178)

*Supply chain descriptors rated 1-2 or 4-5 on 5-point scale. **A** Higher than other group at 90% or higher level of confidence

- **Technology.** Companies rating themselves higher on using data, and supply chain visibility make faster progress. In addition, companies that are better at supply chain planning make faster progress.

The next question was, "How can companies make faster progress?" My answer is:

- Build a guiding coalition.
- Align with sales and finance, and drive data-driven discussions on complexity and cost-to-serve.
- Define a balanced portfolio and hold functional leaders responsible for corporate metrics.

I hope this helps! I am almost done with my spring tour. I have presentations in Barcelona, Peru and South Africa left in May/June. I hope to see you in my travels.

Activists at the Gate

Last week was my final road trip for the year. When the plane touched down in Philadelphia I gave thanks to not have to travel again for the next three weeks. While I love working with clients, and gave thanks for the face-to-face interaction, I am looking forward to a couple of quiet weeks of downtime.

During my last trip of 2015 I spent a couple of days with a publicly-held company in the Midwest. The company is outperforming its peer group on operating margin, but the company is underperforming their competition in the areas of growth and inventory turns.

In the morning we reviewed the team's strategy for 2016. The focus was on costs (their area of strength), but not on inventory or Return on Invested Capital. I find this often to be the case. (Their inventory levels were three times that of

their peer group.) When I pushed back, the team started to remark that inventory growth was the result of complexity and manufacturing strategies that they had no control of; however, by the end of the session the group changed their mind. They formulated a plan to bring their metrics back into balance. They found they had more power than they thought. The issue was focus. The problem is that teams often get laser-focused on singular metrics and struggle to deliver on a balanced metrics portfolio.

The Power of Supply Chain Strategy

Their stock is also underperforming to market, and during the strategy day we discussed my recent article in Forbes on the merger announcement of Dow/DuPont. I think supply chain performance has a direct impact on market capitalization. I also believe that if the company outperforms there is a lower probability of shareholder activism. We find the highest correlation to market capitalization when companies deliver on a balanced portfolio of metrics, as opposed to a more singular focus.

Why is this important? The team at the company is fearful of shareholder activism. History is rich with lessons. R.J. Reynolds. Nabisco. Kraft. Heinz. All of these companies learned this lesson the hard way. Each company succumbed, and was redefined by shareholder activism. This is also the story of the Dow/DuPont merger. Both Dow and DuPont struggled with activism over the course of 2015.

With the winds of recession gathering, investor activism is increasing. Jana is currently attacking Conagra arguing that the prior merger with Ralcorp Holdings was a strategic mistake. Activists argue that the companies have under-

performing stocks and restructuring could improve results. Who will be next? Could it be the client in the Midwest? Possibly. That is the fear of the group. I think that delivering on a balanced portfolio is fundamental to this strategy.

What Can a Supply Chain Leader Do to Deter Activist Takeover?

In 2014 the S&P 500 and Nasdaq generated double-digit returns while the Dow Jones Industrial Average returned 8.2%. Stock performance below these levels is considered an "underperforming stock." The longer the stock is underperforming against the peer group, the greater the risk of shareholder activism.

Supply chain metrics have a high correlation to market valuation. Market capitalization or valuation is the price of the stock against the number of shares outstanding. In 2014 we tested which metrics have the highest correlation to market capitalization.

In Table 1, note that across all industries days of inventory has a high correlation with market capitalization. In our research we find that the combination of high values of inventory turns, Return on Invested Capital (ROIC) and operating margins drives the highest levels of market capitalization. While not a sure bet, and acknowledging that markets are not rational, I believe that the higher performing supply chain can improve market capitalization.

Table 1. Correlation of Supply Chain Metrics by Industry Segment

Morningstar Sector	Discount Stores	Medical Care	Drug Manufacturers (Major)	Household & Personal Products	Chemical	Packaged Food	Communication Equipment	Medical Devices	% of Industries Demonstrating Correlation per Metric
Number of Companies:	11	38	43	31	25	56	96	78	
Days of Inventory (DOI)	X	X	X	X	X	X	X		88%
Days of Sales Outstanding (DSO)	X	X		X	X	X	X	X	88%
Days of Payables Outstanding (DPO)		X		X	X	X	X	X	75%
Return on Invested Capital (ROIC)	X			X	X	X	X	X	75%
Current Ratio (CR)		X	X		X		X	X	63%
Operating Margin (OM)	X	X	X		X	X			63%
Working Capital Ratio (WC)	X	X		X			X	X	63%
DPO/DSO (DPO/DSO)	X		X				X	X	50%
Free Cash Flow Ratio (FCF)		X	X	X			X		50%
SG&A to COGS Ratio (SGAC)		X		X			X	X	50%
Return on Assets (ROA)						X	X		25%
Return on Net Assets (RONA)						X	X		25%
Year-over-Year Revenue Growth (YOY)							X	X	25%

Source: Supply Chain Insights LLC. Equations based upon data from 2006 Q1 to 2011 Q4. NOTE: The number of companies is the number listed in the Morningstar sector at Ycharts.com when the peer group was defined between March and June 2013. The number of companies included in the analysis may be smaller due to data availability.

However, this is hard to do. The supply chain is a complex system, and the delivery on these results requires cross-functional alignment, the management of complexity, and a holistic strategy focused on the delivery of a balanced portfolio of metrics. Most companies lose performance by focusing on functional metrics and sub-optimizing overall performance.

If we take a look at history, in the process industries, as shown in Table 2, companies have elongated payables to improve working capital and accelerate the cash-to-cash cycle; but the progress on inventory turns in consumer products, beverage, and pharmaceutical companies is deteriorating. What can we learn? What can a supply chain leader do?

Focus on Inventory.

This client, like many I work with, interchanges the term inventory with working capital. The first step is recognizing that they are not the same. Working capital is current assets minus current liabilities. The cash-to-cash cycle is a contributory factor to freeing working capital. Cash-to-cash (C2C) is a simple formula: days of receivables plus days of inventory minus days of payables. While the supply chain leader cannot do much to control receivables, the supply chain strategy is a strong contributor to the inventory levels.

At this company, during this holiday, they are celebrating and rewarding improvement on working capital with bonus incentives; but, what they have really done is extended payables, but not improved inventory levels. In fact, the team has gone backward in the management of inventory.

Table 2. Current State of Process Industries

Process Industries: Performance and Improvement (2006-2013)

Industry	Year-Over-Year Revenue Growth	Operating Margin	Inventory Turns	Cash-to-Cash Cycle	Revenue Per Employee (K\$)	SG&A Ratio
Apparel Manufacturing	14% ↑82%	0.12 ↑32%	5 ↑68%	150 ↓8%	400 ↑355%	27% ↑63%
Beverage	9% ↑61%	0.19 ↑16%	2 ↓4%	53 ↓46%	512 NC	24% ↓16%
Chemical	8% ↑45%	0.10 ↑10%	6 ↑4%	87 ↓23%	557 ↑23%	14% ↓27%
Consumer Packaged Goods	5% ↑25%	0.14 ↑73%	8 ↓482%	72 ↑17%	333 ↑14%	26% ↓9%
Food	5% ↑55%	0.10 ↑19%	7 ↑17%	40 ↑4%	534 ↑55%	20% ↓18%
Grocery Retail	6% ↑31%	0.03 ↓37%	17 ↑1%	10 ↓50%	405 ↑54%	14% ↑6%
Mass Retail	9% ↑50%	0.06 ↑20%	6 ↑6%	3 ↓148%	350 ↑48%	23% ↑6%
Medical Device	6% ↑38%	0.14 ↑32%	2 ↓13%	206 ↑16%	351 ↑12%	34% ↓4%
Pharmaceutical	8% ↑47%	0.23 ↑29%	3 ↓16%	155 ↓47%	572 ↑32%	27% ↓8%
Retail Apparel	18% ↑39%	0.39 ↓27%	5 ↑5%	68 ↓26%	325 ↑18%	27% ↓5%

Source: Supply Chain Insights 2015. Derived from YCharts

To improve inventory levels the team needs to focus on the form and function (see Table 3) of inventory with a clear focus on having the right inventory in the right location to maximize customer service. In this case the client's opportunity is in the area of cycle stock management in manufacturing planning. If they can tie the manufacturing schedule to inbound customer orders they can do more direct plant shipments and reduce overall inventory levels (and costs).

Table 3. Form and Function of Inventory

Form	Function
Supplier owned inventory: raw materials	In-transit Inventories: Inventory that is on trucks, barges and containers. The longer the trade-lanes and the slower the mode, the larger the requirements for in-transit inventory.
Company owned inventory: raw materials	Cycle Stock: In the planning of production, finished good production is cycled to ensure that the production lines are fully utilized. The average rotation between products on production lines in consumer packaged goods is three weeks.
Work in process inventory	Safety Stock: Inventory requirements to buffer demand and supply volatility.
Finished goods at the company warehouse	Seasonal Inventories: Inventories required to support seasonal builds.
Finished goods in the channel	Promoted Items: Inventories to support the promotional lift to support a promotion.

Back-Off on Payables.

While most clients speak of working capital and use the term interchangeably with inventory, what they have actually done is increased payables. The increase in payables penalizes the suppliers and increases their cost of capital. Ironically, the manufacturer typically has a lower cost of capital than their suppliers, and should extend it to the supplier to reduce overall costs, but the trap that most manufacturers have fallen into is elongating payables to drive a short-term impact in C2C performance.

With most companies currently at 60 and 90 days on terms of payment, this is no longer an option. We have ex-

tended payables to such a level that further extension is not viable. (The extension of payables for a supply chain leader is like being on a bad drug. It gives a short-term high, but does damage to overall results.) As a result, to reduce C2C, the company must focus on inventory improvement.

Inventory Management Impact.

While most companies think that the reduction of inventory has a direct and negative impact on customer service, this is not true. IF the inventory is right-sized using the approaches for multi-tier inventory management with a focus on form and function of inventory, customer service can usually be improved. The key element is planning and making sure that the right inventory is in the system. The company must make this change through planning and focus. It cannot be a slash and burn strategy.

One mistake that most companies have made is a sole focus on safety stock reductions. This has limited impact. Instead, they need to focus on the management of form and function of inventory with a focus on buffer definition.

Secondly, companies with functional metrics that reward manufacturing with Return on Asset (ROA) metrics, the more likely the company is to operate with high levels of inventory. To make the transition the company must migrate from a functional to a holistic approach, aligning cross-functionally on the metrics that matter, and rewarding the functions for reliability.

The ironic part of this story is that the reduction of inventory will also reduce costs: warehouse costs, in-transit inventory, and handling. However, the path to get there will require rethinking metrics, improving alignment, and changing the focus.

Summary

Will this change decrease a company's risk of activism? There are no guarantees. However, I do believe that companies that consistently underperform on the metrics that matter—Return on Invested Capital, Inventory Turns and Operating Margin—are more vulnerable. What do you think? Any insights for the supply chain teams facing this challenge?

Benchmarking the Discrete Industry for 2016

For the supply chain leader 2016 is time to reflect and build budget targets. To help, here I share industry trends. For the discrete industries we contrast the industry averages for growth, operating margins, inventory turns, cash-to-cash cycle, revenue per employee, and SG&A ratio for the periods of 2006-2014 and 2011-2014. For each metric we show the averages and the percent change from the beginning and end of the period. What can we learn?

Growth Is Slowing. All industries are in decline. With the headwinds of a recession gathering, companies are batten- ing down the hatches.

Table 1. Metric Performance for Discrete Industries

Discrete Industries: Performance and Improvement

Industry	Year-Over-Year Revenue Growth		Operating Margin		Inventory Turns		Cash-to-Cash Cycle		Revenue Per Employee (k\$)		SG&A Ratio	
	2006-2014	2011-2014	2006-2014	2011-2014	2006-2014	2011-2014	2006-2014	2011-2014	2008-2014	2011-2014	2006-2014	2011-2014
Aerospace & Defense	6% ↓4%	9% ↓6%	0.04 ↑3%	0.06 ↑1%	8.64 ↓358%	7.76 ↑64%	72 ↑6460%	106 ↑355%	299 ↑202%	378 ↑49%	9% ↓1%	9% N/C
Automotive	8% ↓5%	9% ↓2%	0.04 N/C	0.04 N/C	10.13 ↑112%	10.81 ↓67%	55 ↑799%	50 ↑775%	1006 ↑961%	1678 ↓54%	10% N/C	10% N/C
Automotive Suppliers	8% ↓8%	8% ↓14%	0.09 ↑2%	0.10 ↑2%	11.57 ↓80%	11.59 ↓39%	38 ↑356%	40 ↑766%	245 ↑177%	266 ↓2%	13% N/C	13% N/C
B2B Technology Suppliers	7% ↓12%	5% ↓14%	0.09 ↑1%	0.11 ↑2%	11.37 ↑107%	11.63 ↓53%	62 ↓1009%	61 ↑744%	423 ↑96%	416 ↓83%	16% ↓1%	1% N/C
Consumer Durables	7% ↓15%	6% ↓10%	0.05 ↑2%	0.05 ↑1%	8.34 ↓75%	8.36 ↓81%	32 ↑447%	36 ↑369%	394 ↑25%	384 ↑49%	19% N/C	19% ↑1%
Consumer Electronics	2% ↓8%	N/C ↓6%	0.07 ↑4%	0.07 ↑1%	9.25 ↓235%	8.56 ↓200%	48 ↓2200%	48 ↑1100%	254 ↓62%	237 ↓32%	20% ↑2%	20% ↑1%
Contract Manufacturers	3% ↓24%	-1% ↓19%	0.01 ↓1%	0.02 N/C	8.12 ↓212%	7.67 ↓97%	34 ↑14%	36 ↑11%	191 ↓33%	184 ↓29%	7% ↑3%	7% ↑3%
Heavy Equipment	8% ↓28%	6% ↓21%	8 ↓2%	9 ↓0%	6.03 ↓126%	5.92 ↑119%	106 ↓424%	116 ↑2509%	442 ↑75%	499 ↓16%	11% ↓2%	11% ↓1%
High Tech	11% ↓23%	5% ↓44%	0.11 ↓15%	0.10 ↓13%	19.66 ↓4%	21.29 ↓69%	40 ↑32%	38 ↑101%	546 ↑91%	601 ↓426%	15% ↑5%	16% ↑7%
Medical Devices	6% ↓4%	5% ↓2%	0.18 ↑5%	0.19 N/C	7.67 ↑111%	7.65 ↓29%	159 ↑4823%	169 ↑768%	303 ↑59%	320 ↑1%	36% ↑4%	37% ↑1%
Semiconductor	6% ↓5%	4% ↓2%	0.11 ↑5%	0.18 ↓4%	10.76 ↑73%	10.60 ↓213%	55 ↑3209%	73 ↑1750%	409 ↑97%	439 ↑64%	13% ↓3%	12% N/C

Source: Supply Chain Insights 2015; Derived from YCharts

Operating Margin. Operating margin improvement was easier at the start of the last decade. It is more difficult now.

Inventory Turns. Progress on inventory turns is declining due to business complexity. Inventory tactics to right-size buffers and manage the form and function of inventory matter more than ever.

Cash-To-Cash. While progress on inventory turns is declining, reductions in payables are driving cash-to-cash improvements. This, over time, erodes costs. To drive value companies with a lower cost of capital should fund investment for their suppliers that have a higher cost of capital.

Revenue-Per-Employee. Outsourcing and labor reduction projects were easier at the start of the last decade. They are more complex now. So, what can we learn?

- **Each industry has a different potential.** Set your targets based on industry performance.
- **Driving progress is more difficult.** This is a case where complexity management and a focus on year-over-year improvement is paramount. Set realistic expectations.
- **There is no magic bullet.** Supply chain leadership requires focus and leadership.
- **Faster success happens when there is organizational alignment.** Build a bridge to your commercial teams and work to close the gap between commercial teams and operations. Define customer-centric supply chains that provide value to your customers in a meaningful way. Work with your commercial teams to accomplish this task.
- **Educate the executive team.** This is the purpose of this post.

Insights on the Supply Chain Metrics That Matter - Update 1

In the United States, the rhythm and cycle of business slows in the face of the Thanksgiving holiday. When the holidays roll into my life, I feel that I can take a breath.

Holidays bring cancellations, and holes quickly appear in the calendar. I find this to be a good time to write, and look forward to crossing off those nagging items at the bottom of the to-do list that seem to never get done. One of the things on that list is to write a series of blog posts on my lessons learned from presenting on the *Supply Chain Metrics That Matter* research from my recent book. This blog is the first in the series.

The Preface

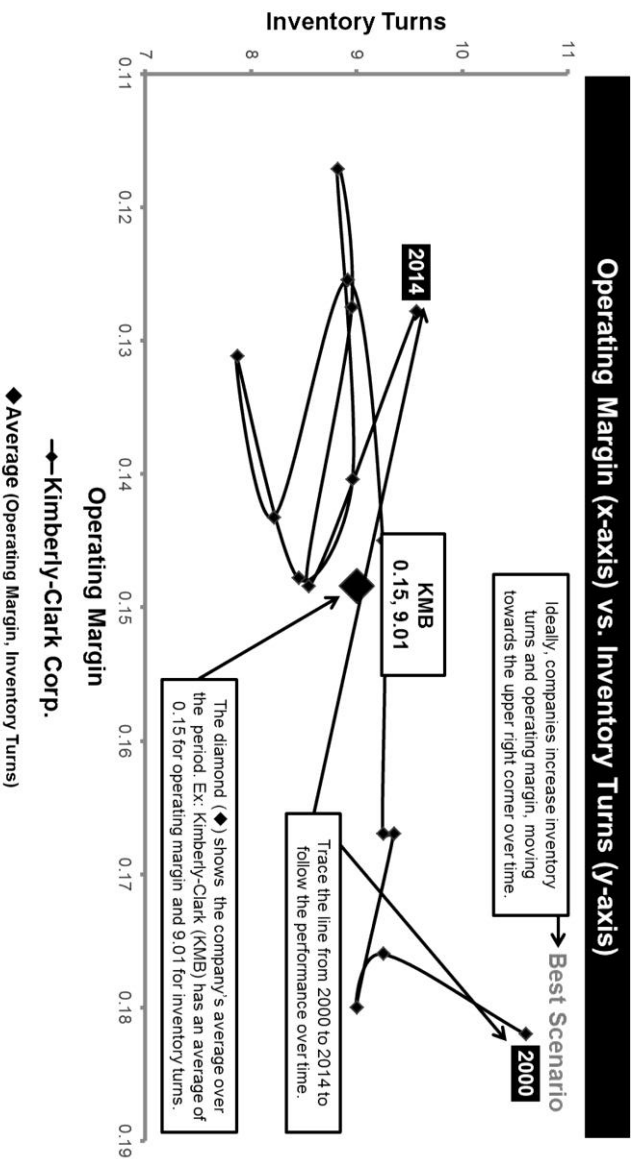
On December 26th, 2010, I started writing the first chapter of my first book, *Bricks Matter*. I was excited. 2012 was the thirtieth anniversary of supply chain management, and I wanted to write a celebratory book.

In my role as an industry analyst, over the last ten years, I had worked with over 600 companies, and I wanted to tell their story. At the time, I believed that the first-generation supply chain pioneers precipitously reduced costs, improved inventory and overcame complexity. Based on all of the projects that I had reviewed over the course of the last decade, I assumed that I would see it in balance sheet results.

As I cleaned the holiday dishes and scraped apple pie crust from my counter, I started thinking about the task at hand. It was daunting. I had never written a book before. To start the process, I started printing balance sheet information. All afternoon, as the information rolled off the printer, I placed the printed information into two stacks: companies that had improved inventory turns and operating margin and those that had not (for the period of 2006-2011). I was shocked to find that nine out of ten companies were stuck and had not made progress. I shook my head when I saw how many of these companies were clients. The orbit chart of Kimberly-Clark is a typical pattern. The company's results in both inventory turns and operating margins has gone backwards.

I was under contract to write *Bricks Matter*; and faced a serious dilemma. The story was vastly different than what I scoped in my book abstract to the publisher. What should I do since the premise of the book that I submitted was flawed? I tossed and turned and called my publisher.

Figure 1. Orbit Chart for Kimberly-Clark



Source: Supply Chain Insights LLC, Corporate Annual Reports 2006-2014 from YCharts

I chose to write the book *Bricks Matter* as a nonfiction, historical view of supply chain planning, and when completed, to launch a research project to find out why nine out of ten companies were stuck. This four year research project resulted in the writing of a second book, *Supply Chain Metrics That Matter*.

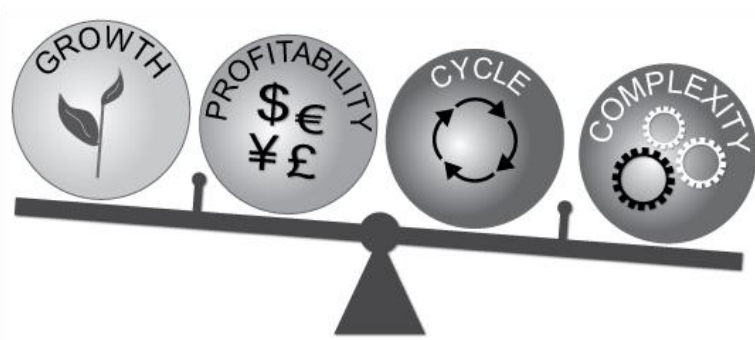
Writing a book is not for the faint of heart. For each book, I wrote two days a week for eight months to produce nine chapters averaging 12,000 words. While I know that neither will make the New York Times Best Sellers List, as the words moved from my fingers onto the pages, I gained clarity.

In a series of interviews, quantitative studies and statistical data mining, I figured out that nine out of ten companies were stuck for five reasons:

1. **Incremental Versus System Thinking.** The supply chain is a complex system that most supply chain leaders have faced incrementally. The system is a non-linear, adaptive system where we have tried to force-fit linear optimization tools. As a result, companies have made progress on projects in pockets; but have struggled to bring the savings and results to the balance sheet.
2. **Functionally-Based Goals.** Only 1/3 of companies have a holistic leader where source, make and deliver report through a common organization. Because the functions are not aligned, projects are focused on driving functional outcomes. As a result, the organization sub-optimizes the results. (Look for more on this in a subsequent blog.) The best results happen when the requirements of source, make and deliver are orchestrated together.

3. **Project-Based Focus.** Companies have hundreds and thousands of projects. There is a belief that if each project has a well-defined ROI that goodness will happen; however, unless the projects are aligned to the strategy, they lack cohesion, and project results can counteract each other.
4. **Belief in Historic Best Practices.** Because of the functional orientation of teams, and the historic focus of functional improvement, many leaders do not see the need to embrace the supply chain as a complex system and design outside-in processes. There is a general belief in the industry that there are supply chain best practices; and that these historic practices (which are often functional in nature) can be used to drive superlative financial results. Instead, the historic practices need to be vetted against the supply chain strategy and rationalized using systems theory.
5. **Lack of Holistic Metrics Frameworks.** Most companies measure too many things (their metrics frameworks have too many metrics and they are not structured). As a result, it is difficult to get balance in the complex system. To help clients, I developed an image that I term the Effective Frontier. The model, shown in Figure 2, is based on the belief that companies need to balance growth objectives against cost, inventory and Return on Invested Capital objectives. The best results—*increase in market capitalization*—happen when there is a balance between cost, cycle and complexity measurements. The focus on a singular metric will throw the supply chain out of balance and sub-optimize the system.

Figure 2. The Effective Frontier





The Story

It was a rainy Tuesday afternoon. (One of those days when the rain falls in heavy sheets and no umbrella or raincoat can keep you dry.) My clothes got wet running through the parking lot to the visitors lobby. Soaked through and through, I was quickly whisked from the lobby, up the elevator to the meeting on the top floor, to present the key insights from the recent book. It was a cross-functional team of a global conglomerate.

The inquiry started with a discussion on the Supply Chains to Admire methodology. Rescheduled three times, and with changing agenda, I was apprehensive that I would hit the mark.

I started the meeting by sharing the balance sheet results of peer group competitors. All of the companies were stuck in a similar way. The group peered at the charts like pigs watching TV. (The orbit charts are a different view and take some time to internalize.) At the end, the leader of the group stated, "I don't get it. We need a framework that can help us measure more than two metrics."

Table 1. Bonus Matrix Based on the Supply Chain Metrics That Matter Framework

<p>At a Corporate Level, Focus on Balance, Strength and Resiliency </p>		<p>Corporate Bonus for all Functions: 60% Based Equally on Goals in Revenue Growth, Operating Margin, Inventory Turns, On-Time Orders, Safety and ROIC</p> <p>Stretch Objectives for CSR: Carbon and Electricity Usage</p>				
Marketing	Sales	Customer Service	Manufacturing	Procurement		
Market share	Deductions from orders	Orders shipped complete	Overall equipment effectiveness (OEE)	Delivered costs of direct materials		
Profit/case	Returns	Hands-free orders	First pass yield	Prevention of outages		
Good/bad complexity ratio of product portfolio	Customer scorecard ratings	Returns	Product quality	Material quality		
<p>At a functional level, focus on reliability (each function to be rewarded 40% of bonus on reliability metrics.) </p>						

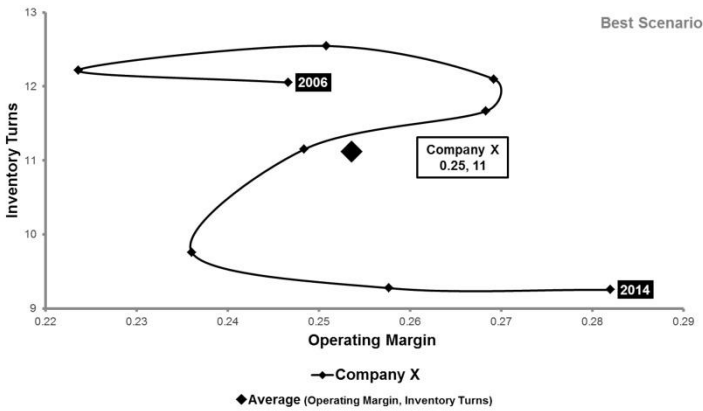
At that time I smiled, and asked the group to turn to chapter 8 in the *Supply Chain Metrics That Matter* book. As the group turned the pages, I swallowed hard. This group, like many I speak to, had struggled so hard to understand the charts representing system theory that they were losing the main point of the discussion.

I then continued, "What I found in writing the book is that the companies driving the greatest results, hold the organization cross-functionally to the metrics that matter on the Effective Frontier (Growth, Operating Margin, Inventory Turns and Return on Invested Capital) while holding the functions accountable for reliability. One company that I worked with recently, used the metrics bonus matrix shown in Table 1."

The group struggled that such a simple approach could work. Their metrics framework was quite complicated with many metrics. With a strong functional finance group, they believed that every function should be held accountable for the lowest functional costs (lowest transportation, manufacturing and procurement costs). The belief was deeply rooted in the culture. The concept of aligning all functions to a balanced portfolio of corporate metrics—with a focus on total costs—while redefining functional metrics to be focused on reliability was too big of a cultural shift.

As a result, I don't expect the company's performance shown in Figure 3 to improve anytime soon. The company is making performance on costs, but not on a balanced portfolio of metrics.

Figure 3. Orbit Chart of Company X



Source: Supply Chain Insights LLC, Corporate Annual Reports 2006-2014 from YCharts

My Lesson

As I walked out of the building, I smiled and thought, "You can take a horse to water, but you cannot make him drink." Shifting from conventionally-held beliefs of legacy practices to drive more holistic systems thinking is hard for most organizations. It usually does not happen with one or two discussions. Instead, the concepts grow over time. I expect to hear back from this company sometime during the year to renew the conversation. As a result, it is time for me to take a deep breath and be patient. When they call, I will be here.

Manage Your Costs like a Decathlete

It is fall and the sounds of football fill the air in my family room as my fingers type on my laptop's keys at my kitchen table. I'm working on my blog posts for Forbes, LinkedIn and The Supply Chain Shaman. It is a weekly Sunday night ritual.

Soon the Sunday night focus on football will shift to another sport. While others in my house love football, basketball and baseball, I am waiting for the Olympics.

During August 5-21 I will be glued to the television to see the competition in Rio.

I love the Olympics. I never miss gymnastics and the track & field competition. When the Olympics kick off, my eyes will be on Ashton Eaton, the winning decathlete from the

2012 London Olympics. He is favored to win the 2016 games as well.

A decathlete tests their skills in ten events over two days. Day one starts with a 100-meter run and is followed by a long jump, shot put, high jump and a 400-meter run. On the second day, the athlete competes in 110-meter hurdles, followed by the discus throw, pole vault, javelin throw, and finishes with the 1500-meter run. Each event is scored on a point system. The athlete receiving the most points wins the event.



In the history of the event no athlete has successfully won all ten events. In 2012 Ashton Eaton scored the most points (8,869), but only won three of his events (the 100-meter run, the long jump and the 400-meter run). When he entered the stadium he orchestrated a plan. He knew the competition and strategically competed using his strengths to his advantage.

For the Supply Chain Leader, Managing Total Costs Is Like Competing As a Decathlete.

One of the things I learned in writing the book *Supply Chain Metrics That Matter* is that supply chain leaders need to manage supply chain costs like a decathlete competes within an event. This is important because one of the most important metrics the supply chain leader must manage is supply chain costs. It is not simple. This management is also growing more complex.

Within the supply chain there are ten distinct cost pools: transportation, manufacturing, procurement, warehouse, inventory, planning, information technology, customer service, cost-to-serve, and general administration. To manage total costs the organization needs to orchestrate functional costs (and trade-offs) against a plan. It requires a skilled leader.

Over my tenure as an analyst, I have personally been involved in the benchmarking of 100 supply chains. When I first started the benchmarking activities I believed that I would find a company which had the lowest costs in each of the categories. I also believed that this company would have the best total costs. However, this was not the pattern. Instead, what I saw was the company with the lowest total costs had the best costs in two to three functional areas and was usually second and third in the others.

Three Barriers

So what do we do? How can we drive the lowest costs? The first step is to learn from three typical mistakes and overcome the barriers:

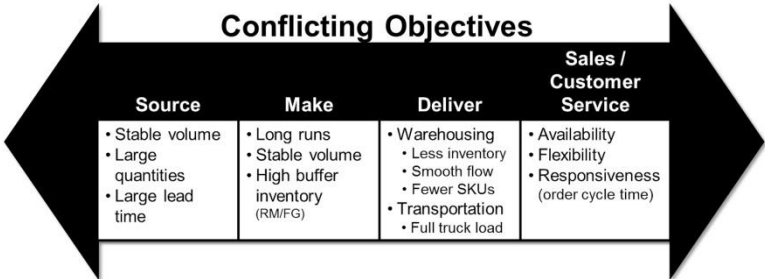
Organizational Mistake #1: A Sole Focus on Functional Objectives.

Most companies throw the supply chain out of balance by trying to have the best costs in all functions. The functions are not naturally aligned; and without clear leadership, the functional efforts will counteract each other and sub-optimize total costs. Shown in Figure 1 is the conflict between functions.

The role of strategy is to set the goals of each function based on the market, the organization's capabilities, and trade-offs between cost, service, and inventory. It is for this reason that organizations should not drive to have the lowest functional costs in all functions.

For the organization, this is a hard concept to grasp. There is enormous pressure from finance, and each functional leader wants to be the best. The greatest pull is between transportation, procurement and manufacturing.

Figure 1. Conflict Between Functions



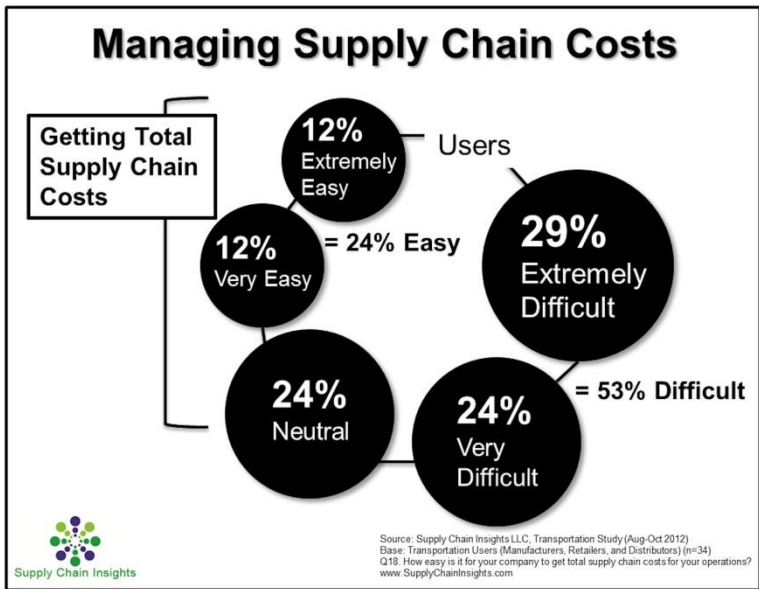
Organizational Mistake #2: Lack of Clarity on Total Supply Chain Costs.

To drive the lowest costs there needs to be clarity for the entire organization on the impact of functional decisions on the total costs. This is more difficult than many believe.

Why? The average company has five to seven Enterprise Resource Planning (ERP) instances and four to five Advanced Planning Systems (APS). Getting to data is a major obstacle.

This has become worse with mergers and acquisitions over the last decade (over 2700 M&A activities in process-based industries). As seen in Figure 2, today only 24% of companies can easily get to total costs.

Figure 2. Ability to Get to Total Costs



Organizational Mistake #3: Orchestration of Continuous Improvement Programs

The average company also has over 100 continuous improvement processes mainly focused on improving costs. Without clarity of total costs and supply chain strategy this is often like pulling money out of one pocket and placing it into another.

What Works?

The fastest progress happens when companies take five actions:

1. A clear supply chain strategy that is communicated cross-functionally.
2. The presence of a supply chain leader with a five to ten year tenure.
3. Bonus incentives focused on total, not functional, costs.
4. The reporting of make, source and deliver organizations to a common leader.
5. An organizational focus on a balanced portfolio of metrics on the Effective Frontier: growth, total costs, inventory, customer service, and Return on Invested Capital (ROIC). These are rewarded and managed cross-functionally.

I hope that this helps. When Ashton Eaton enters the Rio track, let it be a good reminder that managing supply chain costs is analogous to competing in a decathlon. Rest assured that Ashton is training now and building stamina and muscle for Rio. He will need it to compete, and you will also need training and muscle to compete on your journey for Supply Chain 2020. No supply chain leader will win without discipline, talent development and organizational muscle. Best of luck on your journey. I hope that this series helps.

I look forward to getting your comments. Until then I will be on an airplane, working with clients, and writing and publishing research.

Supply Chain Ironies

It is 2016. Time to start writing again. I blog about supply chain excellence to help operations teams. Over the holiday, as I walked the streets of New York, and swam laps in my pool, I thought about the ironies that abound in supply chain management. I think that we could make more progress if we tackle these ironies and improve organizational alignment to improve value.

Here are my thoughts. Let me know your insights:

Irony 1. Nine out of ten companies are stuck at the intersection of operating margin and inventory turns: yet, most teams are focused on adopting best practices from the past. How can we say that we have best practices when most companies are stuck?

Irony 2. In the world of supply chain practitioners, the greatest gaps between supply chain leaders and other func-

tions are between operations and sales/marketing. Yet 80% of supply chain educational programs report through the college of marketing in a business college within academia. Is it possible to get the right talent with this type of reporting structure on academic programs?

Irony 3. With the changes in technology it is possible to move money between parties 20X faster than a decade ago. Yet, due to the adoption of supply chain practices to lengthen payables, money moves 30-45X slower. With a fragile supplier base, should we rethink payables?

Irony 4. Analytics have evolved but the supply chain leader is drowning in data that cannot be used in traditional systems. (Examples include unstructured data from social, warranty data, customer call center notes, email, maps, etc.) Yet 85% of the 2016 investment is targeted to improve traditional technologies that are not able to use new forms of data. Is it time to rethink investments?

Irony 5. Companies want to improve company market capitalization, yet the focus is on functional metrics which may improve the attainment of functional bonus goals, but not improve market capitalization. Examples include Return on Assets, Return on Net Assets, and Revenue per Employee. Should your company craft a cross-functional metrics portfolio based on the metrics that matter?

Irony 6. Brand owners have a lower cost of capital than their suppliers, yet few reduce total supply chain costs by extending these terms to their extended value chain. Time to rethink how to drive value?

Irony 7. 90% of companies have a Corporate Social Responsibility (CSR) document. 72% of these companies push CSR claims in their market messaging. 65% of nonre-

newable resources are outside of the enterprise in the value chain, yet only 22% of companies are aggressively trying to manage their CSR programs with a focus on the extended supply chain. Is this a risk for your organization?

Why are we stuck? Why do the ironies exist? Here is my point of view: Traditional supply chain practices focus on improving the reliability of response. They are traditional. However, today's supply chain cannot sense market changes. The focus has been on the enterprise, not the value chain.

While we have made great progress through the use of conventional technologies and processes over the past two decades, I strongly believe that the market dynamics of global product portfolios, extensive outsourcing, and increased uncertainty of transportation/logistics, call for the rethinking of traditional practices. With rising demand volatility, market shifts, and changing economics, I believe that we need supply chains that sense; and translate the needs of the market into an intelligent response. This means we have to think past these ironies and redefine processes and test the use of new technologies. The leader knows that to better serve the global customer, sensing needs to be from market-to-market (from the customer's customer to the supplier's supplier.) To accomplish this goal we need to think past these ironies to drive value for the customer and the shareholder.

What do you think? I look forward to hearing your perspectives on the ironies of supply chain management.