



ACCELERATION OF ECO-OPERATION

Achieving Success & Sustainability in the Supply Chain



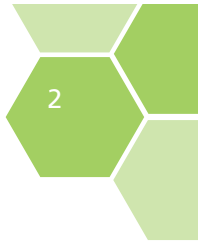


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Introduction

The global “value chain,” consisting of supply and demand chain networks of partners, parts, and processes, has become an increasing area of focus for global product manufacturers as they seek to be more competitive and environmentally conscious. As these companies embrace expanding markets and supply sources, they assume an even greater responsibility to manage efficiencies and standards with trading partners.

“Automating the supply chain so that everything could be closely tracked and monitored was hard enough when it was all in one country. Now that manufacturing has shifted to different continents with people speaking different languages, using different measurement standards and being subject to disruptions ranging from natural disasters to political crises, managing the supply has moved from difficult to incredibly complex.”

Forbes Magazine

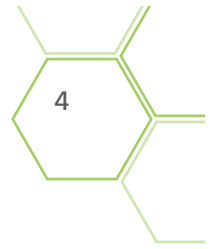
Unifying, focusing and controlling complex, globally distributed and highly synchronized value networks in turbulent, unpredictable times requires real-time operational insights down to the product level, accurate sourcing and sell-through intelligence, and relentless dedication to eliminating waste and realizing new efficiencies in all areas of the go-to-market process. At the same time, economic, social and regulatory dynamics are putting real pressures on global companies to be both “lean and green” in their product sourcing, logistics, transportation, distribution and operational practices.

Never has the need been greater for better acquisition, integration, and utilization of information across the entire network of value chain partners. Key drivers include:

- Growing operational and business unit complexity worldwide
- Shift to outsourced manufacturing closer to customer markets
- Diversification and fragmentation of distribution channels
- More stringent global procurement policies, controls and practices
- Multi-modal logistics and added transportation costs and constraints
- Additional regulatory/sustainability compliance and reporting requirements

“Building better links in high-tech supply chains...the sprawl and complexity of such networks have made it harder to manage end-to-end operations smoothly. Many technology companies are grappling with volatility and disruptions across their supply networks and eliminating waste from duplicative efforts is an ongoing challenge. As product life cycles shrink, we see inventory build-ups in the supply chains of some companies, while others cope with rising distribution costs, on-time delivery problems, or delays in getting new products to market.”

The McKinsey Quarterly



Enter ECO-Operation

In order to address these challenges, issues, and opportunities, The Acceleration of ECO-Operation is a new management mantra aimed at bringing business gain to the value chain through enhanced trading partner visibility, flexibility and new levels of verifiable sustainability across the entire demand and supply ecosystem of global corporations.

The Business Performance Management (BPM) Forum has undertaken the Acceleration of ECO-Operation program in partnership with E2open and the Global Renewable Energy and Environmental Network (GREEN). The Eco-Operation initiative has created a rich repository of information and resources through the creation of original content gathered from insights from leading industry experts and associations and a comprehensive industry survey on the forces and factors driving value chain executives towards greater levels of collaboration and accountability.

The Eco-Operation survey has been commissioned to measure and quantify just how companies are managing the complexities of supply chain demands, distribution costs and environmental concerns. The survey examines current challenges and opportunities and seeks best practices for supply chain professionals.

Driving New Levels of Performance and Insight

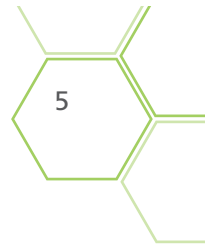
What's driving the embrace of ECO-Operational strategies and practices is the advent of new Software-as-a-Service platforms for increasing collaboration, real-time insight and rapid adaptability across today's "high-performance, multi-enterprise value networks." ECO-Operation reduces business risks and realizes competitive advantage and cost-savings, while also ensuring end-to-end compliance with carbon footprint mandates and emerging greenhouse gas emission standards.

To deliver on this, accountable and verifiable sustainability – what the BPM Forum calls the Greenscape Score™ – is required from all vendors and ingredient suppliers, no matter what size, sector or geographic location.

Global value chain innovators, like Dell, IBM, Cisco, Xerox, Seagate, Hitachi, Philips, Tyco, Vodafone and Boeing, are realizing measurable improvements in business and sustainability performance by driving more of their trading partner interactions through a centralized eHub. Using managed service providers, software-as-a-service platforms and Service Oriented Architectures, these global enterprises are driving bottom line performance and creating greater flexibility and responsiveness across both demand and supply chains.

"Becoming green is no longer an end in and of itself, but the byproduct of optimizing a supply chain. At the same time, transitioning to a Green Supply Chain while also maximizing efficiency is not a clear-cut process."

Industry Week – Diamond Management & Technology Consultants



Research Overview

The BPM Forum conducted in Q2 of 2009 a comprehensive online survey of supply chain, operations, finance, and executive professionals across multiple industries to measure and quantify just how companies are managing the complexities of supply chain demands, distribution costs and environmental concerns. With responses from 125 professionals around the world, the results reveal insights about priorities, progress, and pitfalls that supply chain and finance executives are facing in the midst of more complex and competitive product development environments.

The following report examines the results and interpretations of the ECO-Operation online poll combined with detailed insights from more than 20 corporate and faculty leadership committee members that provided perspectives from the front lines and in-depth industry immersion. The report also includes commentary and content covering best practices and viable solutions in helping companies come to grips with how to begin to insert efficient and environmental practices into strategic supply chain strategies and solutions.

Executive Summary

Executives Engendering ECO-Operation

Nearly 90 percent of survey respondents said that their management subscribes to the principles of ECO-Operation (enhanced trading partner visibility, flexibility and new levels of verifiable sustainability across the entire demand and supply ecosystem). And nearly half said their executives believe in this mantra to a large extent. This is an encouraging level of understanding and buy-in to the fundamentals of the program initiative. Further, these supply chain professionals understand the top benefits of ECO-Operation in terms of CSR compliance, cost efficiencies, and customer responsiveness. Much of the corporate leadership committee was in agreement, stating that there were clear cost, compliance, and carbon reduction advantages to embracing ECO-Operation plans and policies.

Peer Pressure Prevails

A multitude of driving factors are putting pressure on executives responsible for managing the value chain. Indeed, the terrible economy is forcing every company to consider bottom line improvements and more competitive practices. Corporate and industry environmental consciousness is creating the need for more sustainability measurement and momentum. And direct customer demand for more environmentally sound product development and packaging is on the way.

Lack of Leadership

Despite the apparent executive understanding of the benefits of ECO-Operation and the intensifying pressures to do something about it, companies are critically lacking in the means, the metrics, and the visibility into the entire supply chain to make it happen. Nearly two-thirds have inadequate visibility across all tiers and levels of their supply and value chain. Only 20 percent utilize a single hosted platform to improve such visibility. And a vast majority lack the metrics to enforce sustainability throughout their extended supply chain. In short, they are ill-prepared to drive the necessary changes that are required in today's eco- and price-sensitive market.

What You Don't See Can Hurt You

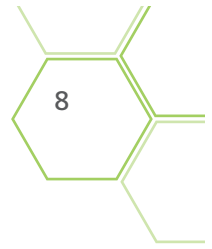
The lack of transparency into the operations of dynamic, multi-tiered supply chains may be severely hampering business performance. Survey respondents identified the top business benefits of greater visibility as cost savings, better customer support, and environmental compliance – three key elements in today's business landscape. A lack of visibility and resulting failure to achieve these important benefits could put companies at a real competitive disadvantage.

Need a Measure of Sustainability Success

A nearly universal need among supply chain professionals is better standards and key performance indicators for measuring sustainability levels of supply chain partners. Two thirds or more don't have goals of supplier carbon neutrality, don't have scorecards to measure supplier sustainability, and see tremendous value in adopting a standardized scoring system.

Key Findings

- 89 percent say their management subscribes to the ECO-Operation mandate at least to some extent, and 46 percent to a large degree
- The top benefits through better ECO-Operation practices include more environmental responsibility, better sustainability compliance, more efficient product manufacturing, and better customer responsiveness
- However, only 38 percent link eco initiatives with operational efficiency to a high degree, and about half to some extent
- 42 percent do not consider their carbon and energy footprint as including their entire extended supply chain, and only 55 percent say their customers would agree
- 78 percent of companies rate the level of synergy, adaptability, uniformity and accountability in their global value chain network as low or just OK
- 60 percent of companies have none, very low or marginal visibility across all tiers and levels of their supply and value chain
- Customers will put more green pressure on their providers. 76 percent said their customers have not yet asked them to measure or reveal their carbon footprint, but two thirds expect customers to demand this in the next year
- More than half say that their competitors use green or ECO-Operation practices for competitive advantage
- An overwhelming 85 percent are actively involved in new programs that drive operational efficiency, CSR and cost-savings across supply and demand chains
- The top initiatives being undertaken in that regard include:
 - Corporate social responsibility policies for the value chain
 - Changes to logistics and transportation methods
 - Environmental guidelines for all value chain partners
 - Strict procurement standards and policies
- The biggest drivers for change in supply and demand chain operations this year and beyond include:
 - Pressure to be more environmentally responsible and sustainable
 - Troubled economy creating need to “tighten the belt”
 - More competitive, price-sensitive market for goods
- The top ways in which greater visibility into value chain drives business gains is:
 - Operational cost savings
 - Environmental compliance for all tiers of suppliers
 - Improved customer service



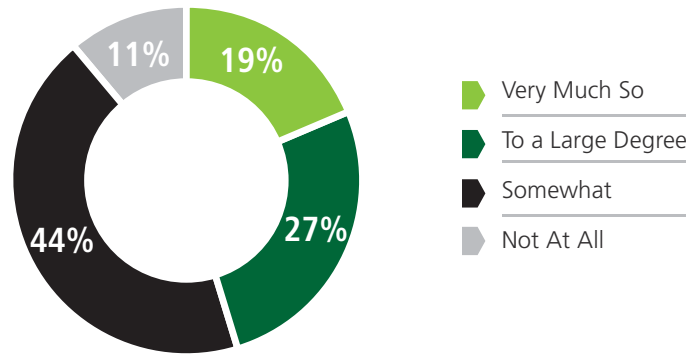
- The most frequent challenges in synchronizing supply chain operations are:
 - No single, universally accessible solution for visibility across the value chain
 - Partners unwilling or unable to provide necessary information
 - Don't have access and visibility into second or third tier trading partners
- Only 20 percent currently use a single, hosted platform that integrates, coordinates and controls every aspect of their value chain network. Of those that use one, 58 percent have seen an impact on value chain performance
- Less than a third have a goal of carbon neutrality in supplier operations and/or customer product use. Of those that do, 71 percent will achieve that goal in four years or less
- Two thirds don't currently have metrics or scorecards for tracking the sustainability efforts of their suppliers and vendors
- Those that have scorecards measure primarily the use of hazardous materials, waste management practices, and carbon footprint
- 80 percent said a standardized score would be valuable to measure emissions, carbon footprint and other environmental impact data for the entire value network of partners
- The top three areas of the value chain process most valuable to measure in terms of environmental sustainability and responsibility are:
 - Transportation and fuel consumption
 - Product and waste recycling
 - Packaging materials and processes
- 35 percent have more than 1000 trading partners to manage in their value chain
- Top industries represented include:
 - Manufacturing
 - Electronics and technology
 - Transportation
 - Food and beverages

Detailed Findings

ECO-Operation Underway

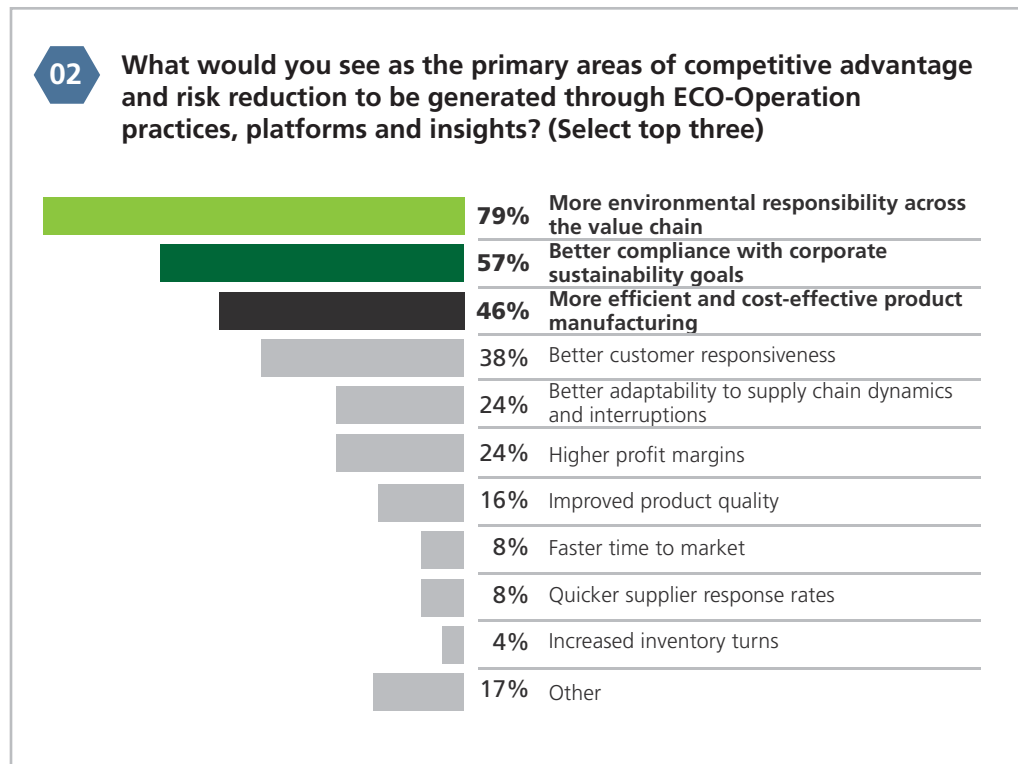
A surprisingly large percentage of respondents said that their management team buys into the tenets of ECO-Operation. 89 percent subscribe to it at least somewhat. Of course, these beliefs haven't yet turned into serious action in many cases, but it's refreshing to know that executives get it and believe in the values of increased visibility, sustainability, and collaboration in the supply chain.

01 To what degree, does your company's management team subscribe to this ECO-Operation mandate?



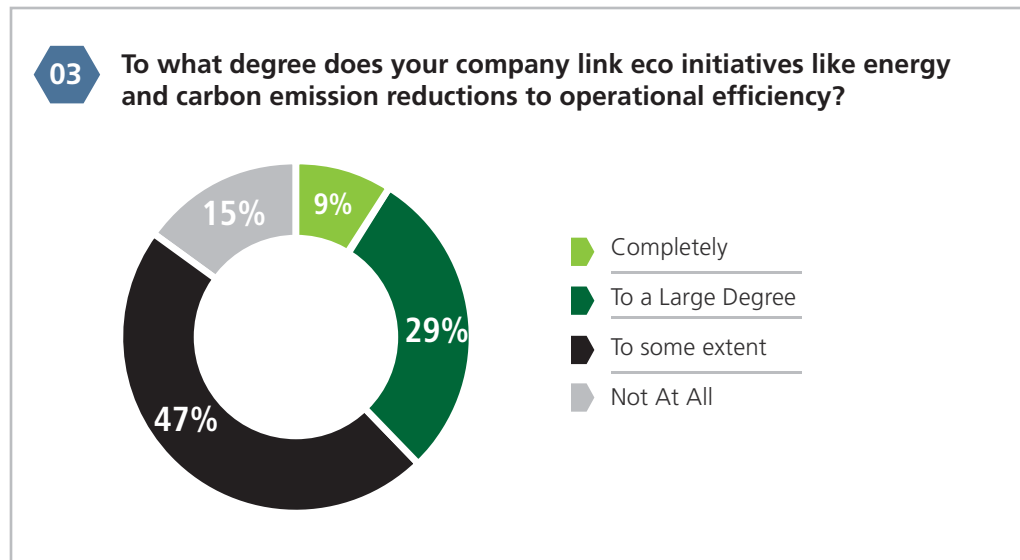
Extensive Business Value Through ECO-Operation

Supply chain professionals point to at least a few clear cut benefits from engaging in ECO-Operation activities. The top three performance areas of environmental responsibility, compliance, and product efficiencies match closely with the key improvements that can be achieved through better visibility and collaboration throughout the value chain. A close fourth is customer responsiveness, another important business factor in today's competitive and troubled economic environment.



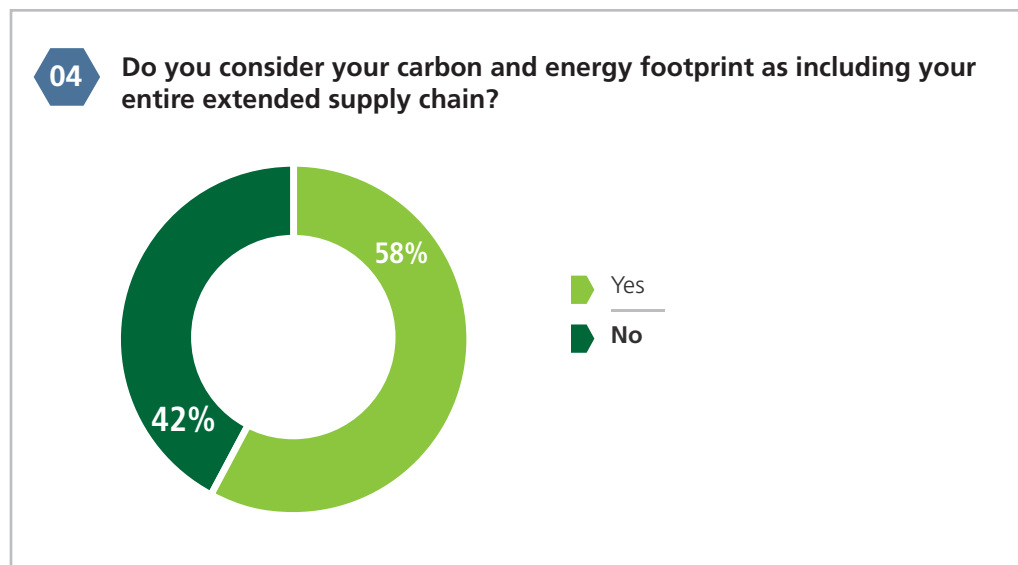
Not Seeing Environmental and Efficiency Equivalency

Only about a third link their environmental activities with operational efficiency to a large degree. This linkage is critical, as managers need to justify environmental efforts and expenditures with real accompanying bottom line gains. As more supply chain executives realize the ultimate business benefits associated with sustainability in the supply chain, the acceleration of ECO-Operation will hit full stride.



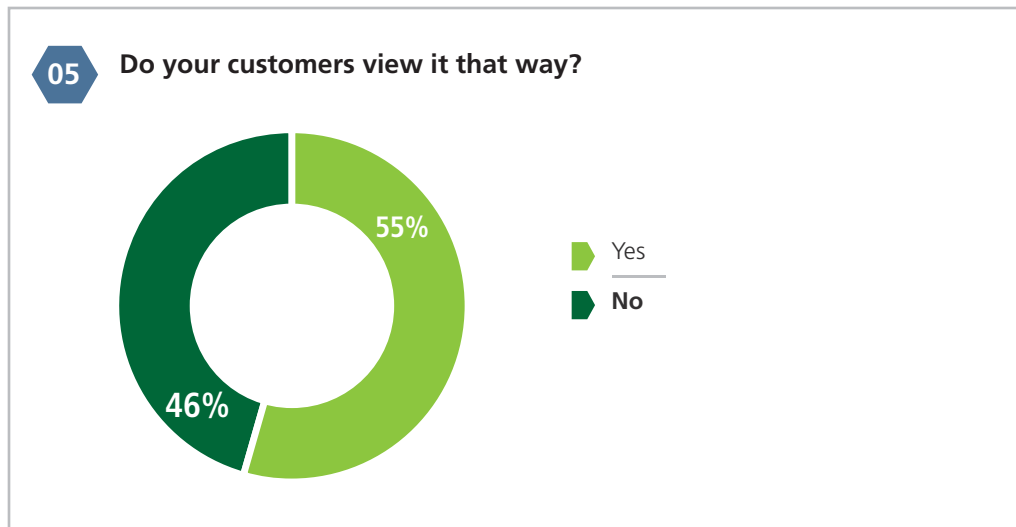
Need to Stretch Sustainability Throughout Supply Chain

More than 40 percent don't include their multi-tiered supply chain partners when figuring in carbon footprint. This is likely the result of the need for better measurement and mindset to assess the environmental impact of the entire value chain and to change corporate thinking to include big picture considerations. As companies begin to accept and adopt better means to collaborate with trading partners, they will likely reconsider how broadly they assess their carbon footprint.



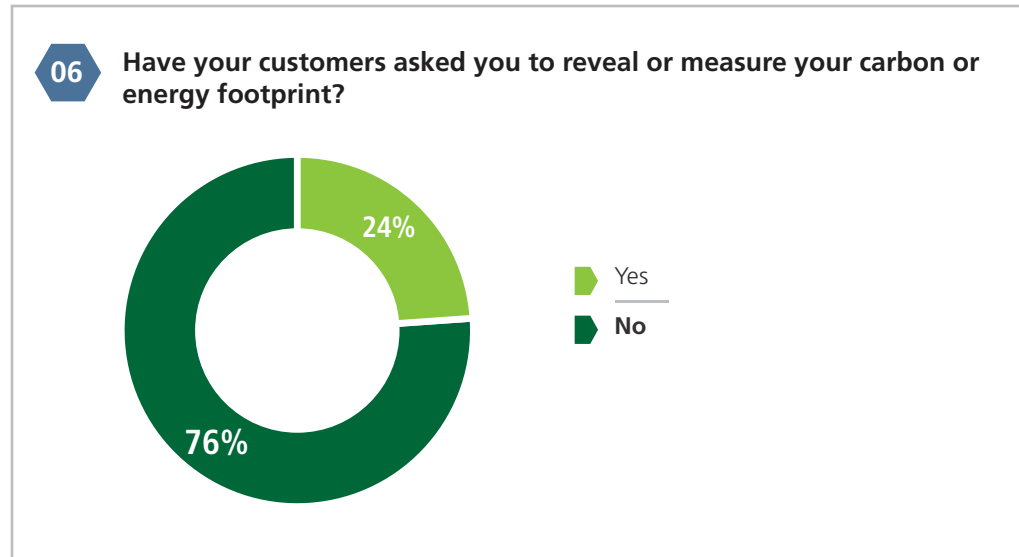
Not Seeing Eye to Eye on Environment with Customers

Only a little more than half of companies said that their customers view carbon footprint across the entire value chain the same way that they do. This suggests a disconnect either at the consumer level or the corporate level in terms of environmental consciousness. Though multiple corporate leadership committee members commented on the subject, it is not clear that customer demand is driving ECO-Operation activities directly yet.



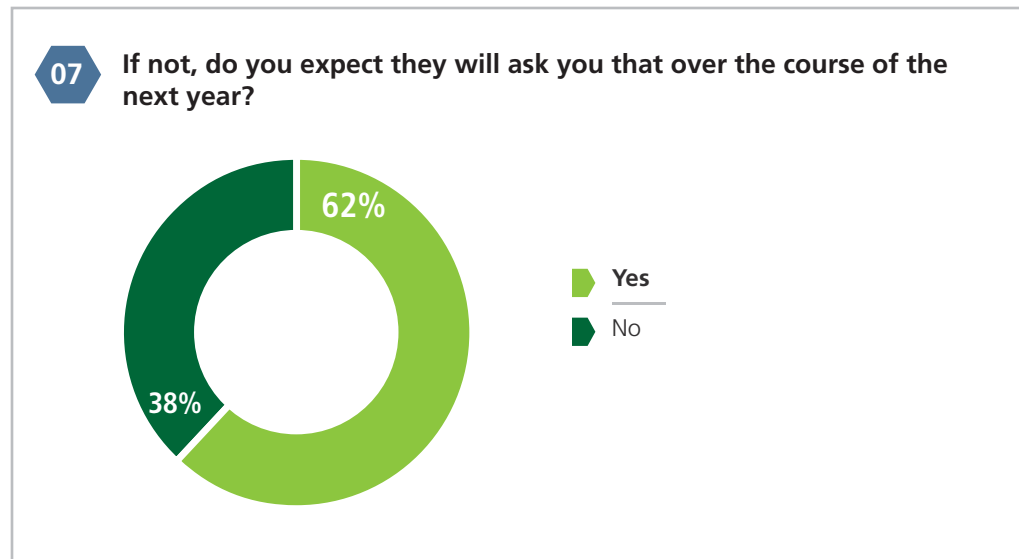
Customer Pressure Minimal to Date

In fact, less than a quarter of companies said their customers are driving the train when it comes to assessing overall carbon footprint. That means that even fewer of them are experiencing pressure yet to measure their environmental impact from top to bottom in the supply chain.



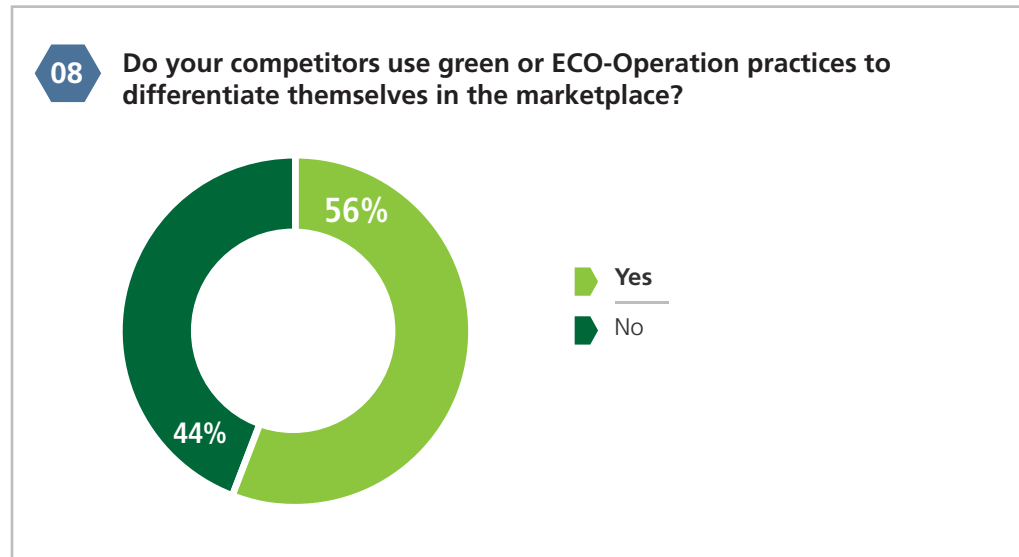
Customer Climate Change Though

However, the percentage saying customers will pressure them on the environment nearly tripled from current levels. Companies better be prepared to respond if the majority of their customers will be pushing for it soon.



Need to Get in the Game, Go Green

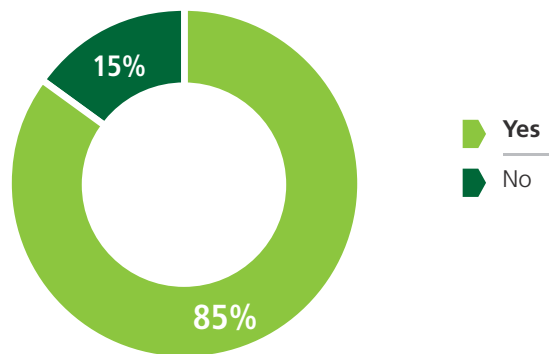
A little over half are seeing competitive pressure to achieve sustainability. As companies more closely link environmental improvements with business benefits, this number will likely grow quickly in the short term. Rapidly growing customer and competitive pressure will drive accelerated adoption of ECO-Operation practices.



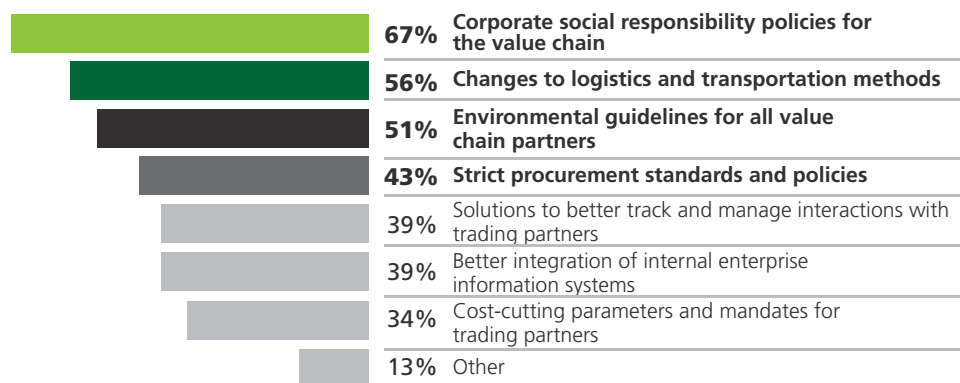
Acceleration of ECO-Ops Action

A surprisingly high number said they are already involved in new programs to drive improvements in the value chain. Top among these are CSR policies, logistics, and environmental guidelines. Fewer companies point to tangible activities related to measurement and integration, however, signaling that more action and better standards are needed.

09 Are you actively involved in new programs that drive operational efficiency, corporate social responsibility and cost-savings across the supply and demand chains?

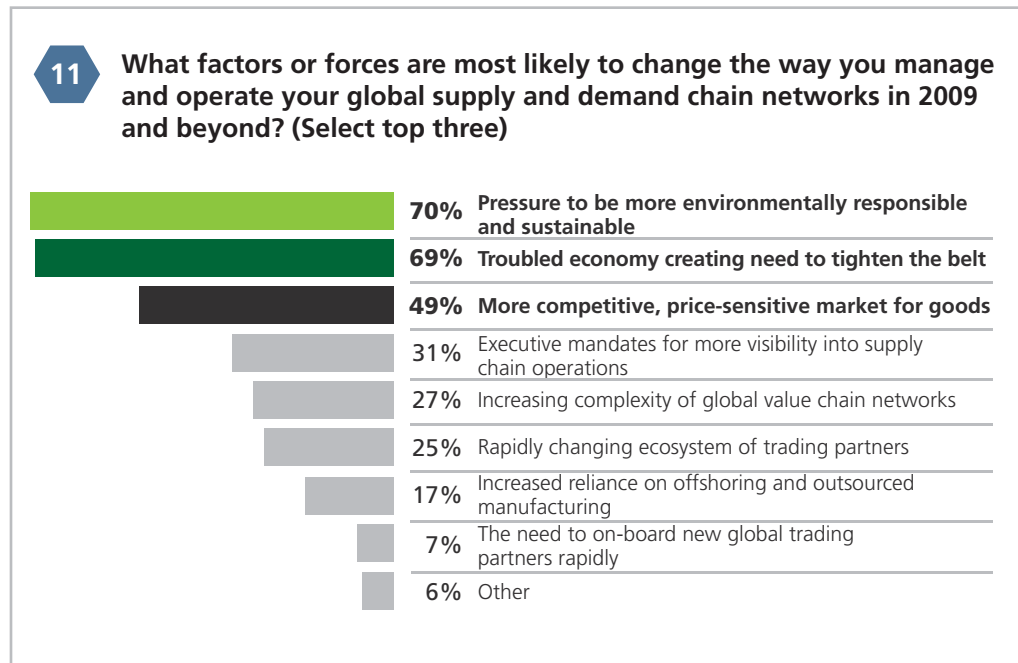


10 If yes, what do these include? (Check all that apply)



Market Factors Forcing Embrace of ECO-Ops

Pressures for sustainability, survival, and competition are driving operational improvements in the supply chain. These pressures are in line with the value proposition of ECO-Operation in helping companies achieve environmental consciousness and competitive gain.



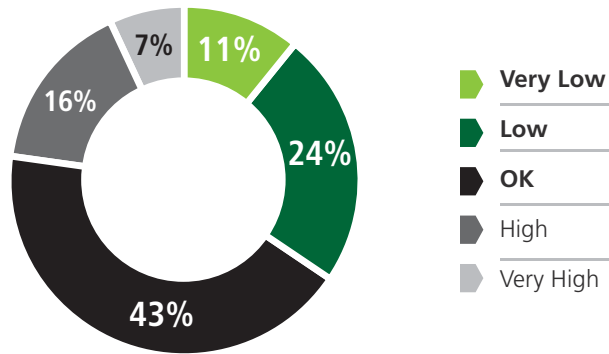
Mixed Ratings on Value Chain Mix

Responses are all over the board in terms of how synergistic and performance oriented value networks are. The core response is "OK" or worse, suggesting significant room for improvement as the pressures for better collaboration and visibility mount. Clearly, companies need better understanding, including the right standardized measures and metrics and the appropriate information solutions to make it work.

78%

Of companies rate the level of synergy, adaptability, uniformity and accountability in their global value chain network very low, low or OK.

12 How do you rate the level of synergy, adaptability, uniformity and accountability in your global value chain network?



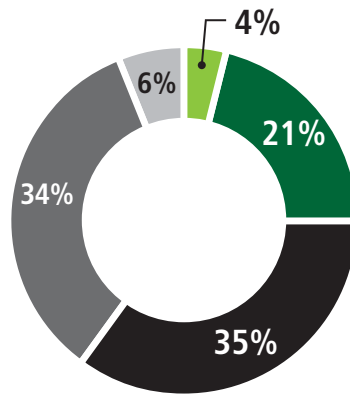
Can't Fly Blind to the Bottom Line

Only 6 percent of companies have complete transparency, and 60 percent don't see past their top tier suppliers. With the dynamics of today's global value chain, visibility is critical to success and the achievement of business and eco goals. Companies need to get better at considering and tracking all levels of trading partner performance.

60%

Of companies have none, very low or only top tier visibility across all tiers and levels of their supply and value chain.

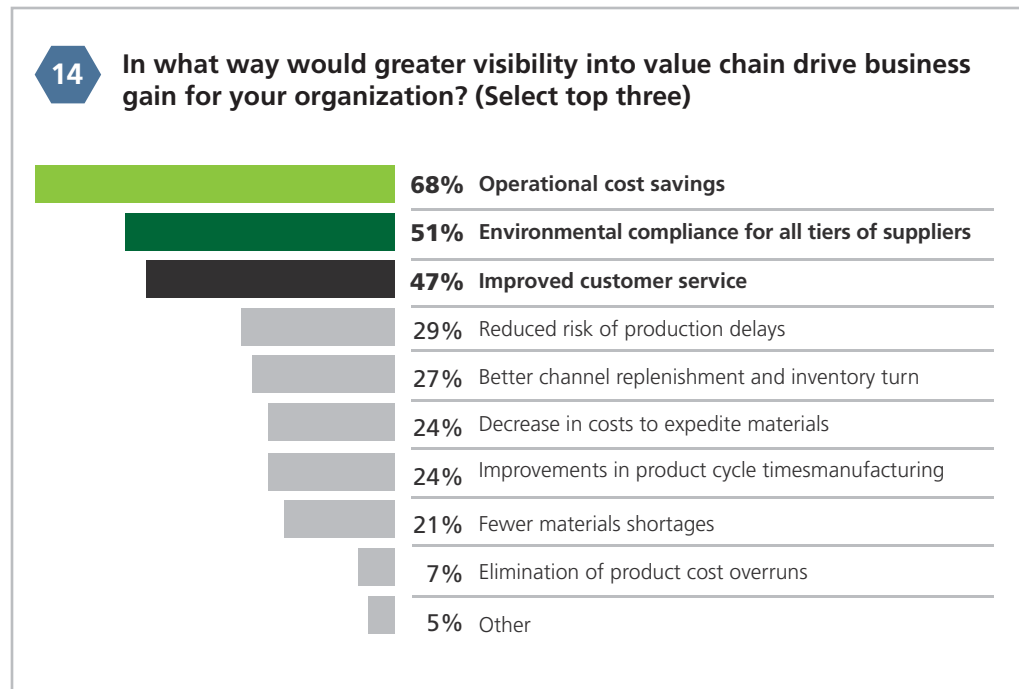
13 What degree of visibility do you have across all tiers and levels of your supply and value chain?



- None
- Very low visibility at all
- Only with top-tier suppliers
- Some visibility into all levels of trading partners
- Complete transparency for all tiers of the value chain

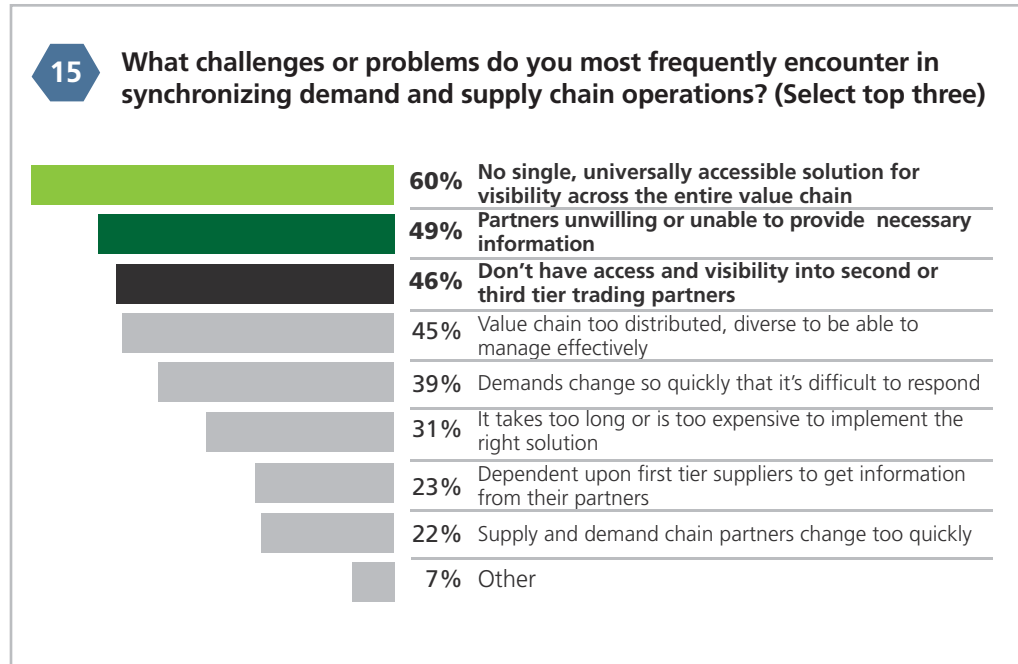
Show Me the Money

Supply chain executives understand the business and environmental benefits of increasing value chain visibility. Three key elements core to the ECO-Operation value proposition are cited: savings, supplier sustainability, and better customer responsiveness. Interestingly, these responses far outweigh traditional supply chain concerns such as overruns or shortages. It appears that new priorities have emerged.



Kinks in Current Value Chains

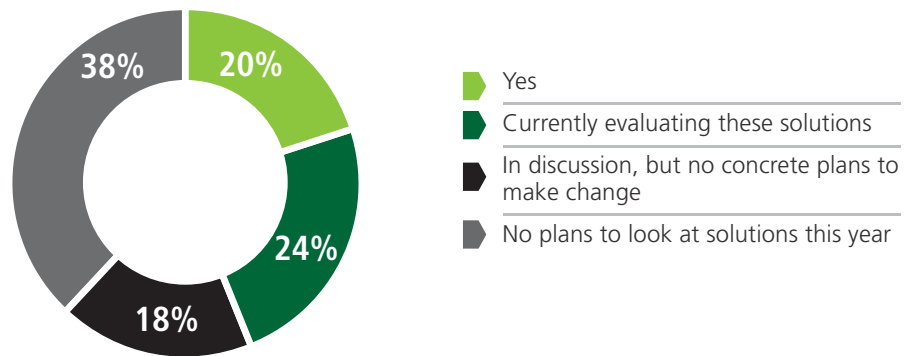
Roadblocks to optimized value chain operations are many and diverse. From a lack of advanced solutions and uncooperative partners to expansive and complex networks, respondents point to a plethora of confounding factors. These all point to the need for improved practices to increase collaboration and visibility.



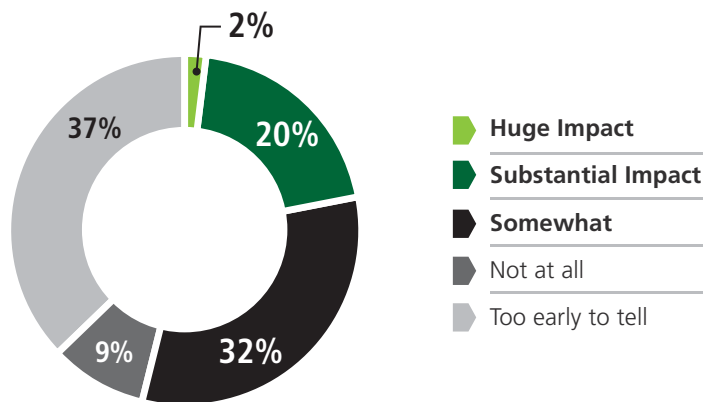
In Search of the Right Platform for Performance

Surprisingly, only 20 percent have adopted a single integrated platform for gathering and analyzing value chain network information. More than 40 percent are considering such a platform. And a majority of those that have implemented such a solution are already seeing performance, accountability, and compliance benefits.

16 Do you currently use a single, hosted platform that integrates, coordinates and controls every aspect of your value chain network?



17 If yes, how has this impacted the performance, accountability and compliance of your value chain network?



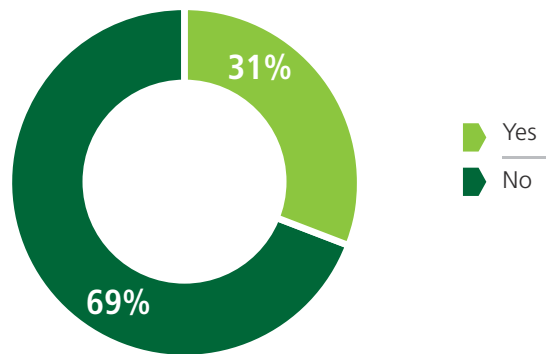
54%

Of companies that use a single hosted platform say it has a huge, substantial or some impact on their performance, accountability and compliance.

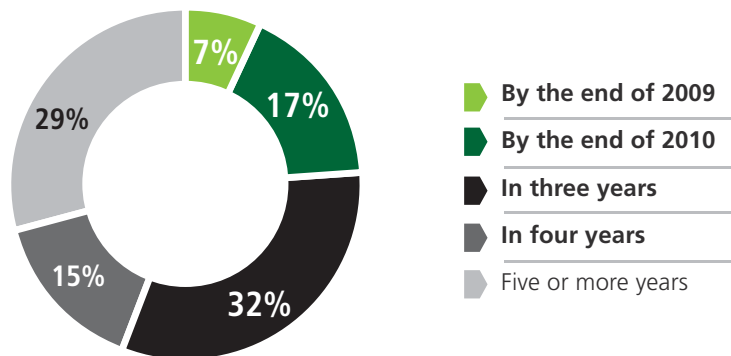
Eco Laggards and Go-Getters

Less than a third of companies have established carbon neutrality goals as part of their corporate social responsibility policies. However, those that have expect to achieve these goals in a short timeframe of four years or less. These figures suggest that the eco go-getters will move rapidly to establish competitive advantage via environmental responsibility.

18 Does your company have a goal of carbon neutrality in supplier operations and/or customer product use?



19 If Yes, by what date does the company expect this will be achieved?



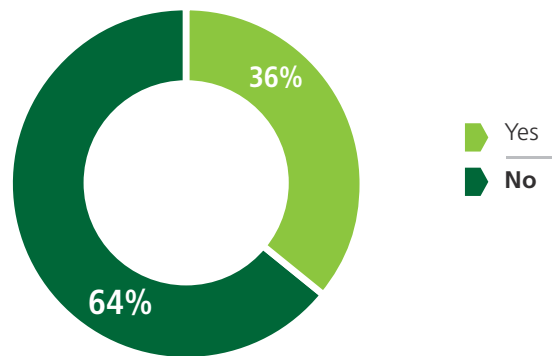
71%

Of companies said that carbon neutrality will be achieved in four years or less.

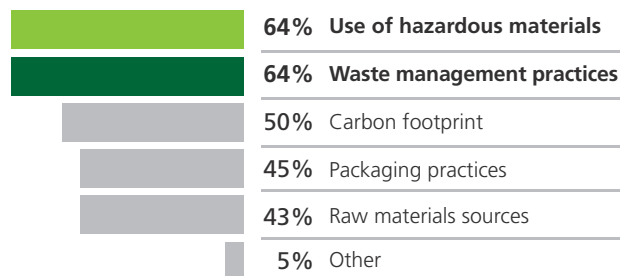
Meager Use of Green Metrics

Only about a third of companies use standardized metrics to assess the environmental impact of their value chain partners. The remaining majority is in need of ways and means to measure environmental responsibility throughout the process. Of those that have begun to measure, the most harmful and regulated environmental practices such as hazardous materials use and waste disposal are most scrutinized.

20 Do you currently have metrics or scorecards for tracking the sustainability efforts of your suppliers and vendors?



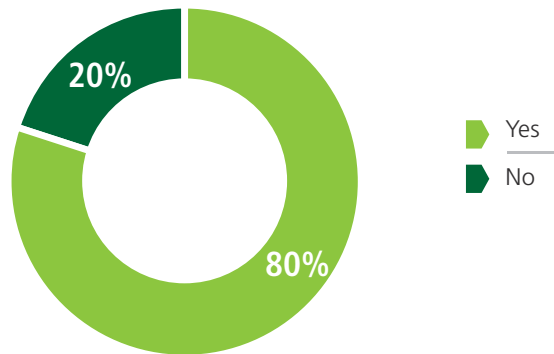
21 If so, what "green compliance" data do you currently collect? (select all that apply)



Universal Need for Better Yardstick

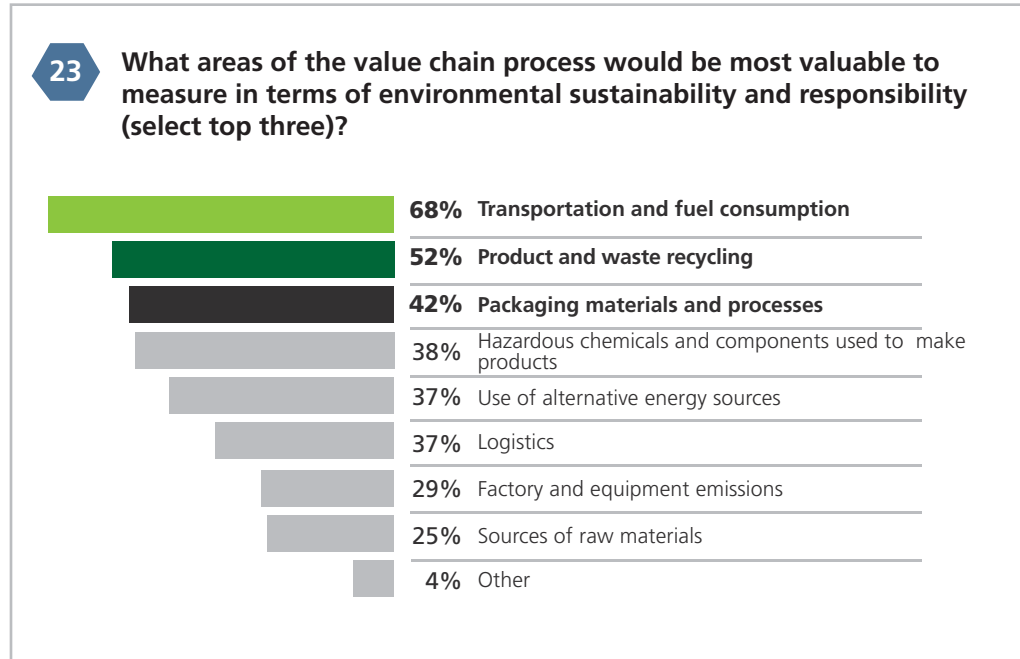
A vast majority of respondents see value in a standardized score for measuring environmental impact information from their supply base. It is interesting that less than half of the number of companies that find value in a Greenscape Score have implemented any form of metrics themselves.

22 **Would it be valuable to your organization to have a standardized GreenScape Score™ to easily measure emissions, carbon footprint and other environmental impact data for your entire value network of partners?**



Full Lifecycle Metrics Most Valued

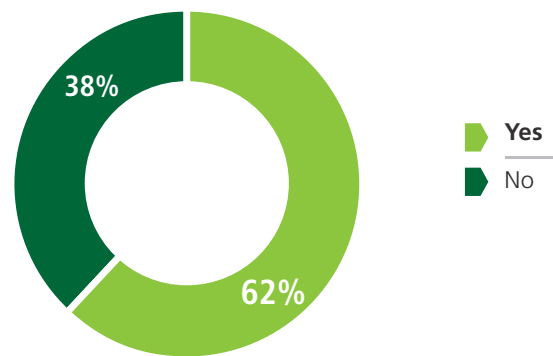
Respondents pointed to a variety of process elements in different parts of the product lifecycle that would be most valuable to measure. From logistics to recycling to packaging, the most desired metric areas involve different partners along the way, suggesting that full value chain visibility is required.



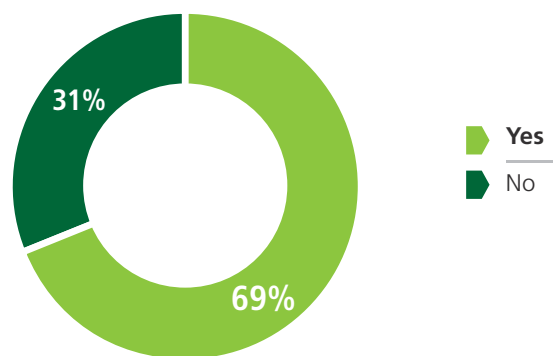
Strong ECO-Ops Commitment and Contribution

Survey participants responded enthusiastically to joining an ECO-Ops community to learn more and share experiences. And 70 percent of those who want to join expressed an interest in actively contributing to the subject area. This interest bodes well for the advancement of ECO-Operation in the marketplace.

24 Are you interested in joining an ECO-OPS community?



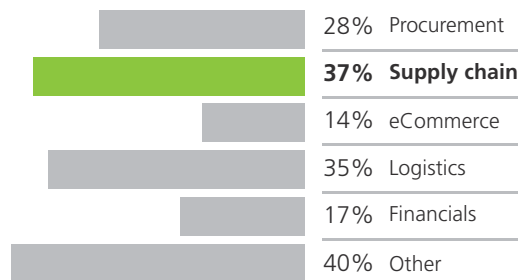
25 If so, could you contribute content, thought leadership or best practice insights?



Multiple Functional Areas Represented

Respondents represented a cross section of responsibilities relating to the value chain, from supply chain professionals to logistics and procurement and other commerce and finance related functions.

27 What areas do you manage in your organization? (check all that apply)



Broad Industry Sample

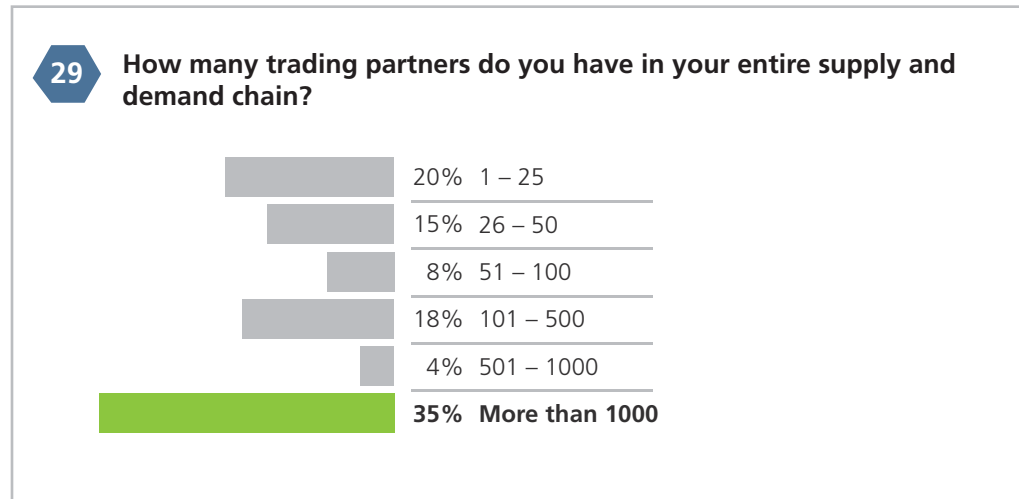
Respondents hail from 22 different industries, with the largest concentrations in manufacturing, electronics, and technology fields.

28 Which industry sector best describes your company's focus?

Response	Answer Options
18%	Manufacturing
14%	Electronics and miscellaneous technology
11%	Information Technology
8%	Transportation
5%	Food and Beverages
4%	Professional Services
3%	Retail
3%	Packaged Goods
2%	Wholesale/distribution
2%	Telecommunications
2%	Consumer Durables
2%	Energy
2%	Automotive
2%	Government
2%	Education
2%	Travel and Hospitality
1%	Pharmaceuticals
1%	Financial Services
1%	Chemicals
1%	Aerospace & Defense
1%	Media and Publishing
1%	Entertainment
0%	Life Sciences
0%	Construction
0%	Utilities
0%	Insurance
12%	Other

Lots of Cards in the Deck

Companies are having to manage vast arrays of trading partners as they navigate through dynamic and global supply and demand sources. Greater than a third polled are juggling 1,000 or more partners, creating an increased need to better manage and monitor complex webs of moving parts, people, and processes.



Executive Insights

The following passages are excerpts from free-flowing interview conversations with corporate and faculty leadership committee members.

Christina De Luca
Chief Procurement Officer
BP, plc



“Sustainability, I think, is the bubbling, emerging agenda in supply chain management.”

BP is a conglomerate business. We do everything from the exploration and production of crude oil and the refining of that to retail operations, retail sites, fast-moving consumer goods, etc. These are quite different businesses, so they involve quite different supply chains.

The number one component of our business, and therefore our supply chain is hydrocarbon, whether it's crude oil or refined products. In terms of spend, we spend somewhere between \$300 and \$400 billion a year buying crude oil, intermediate goods or refined products for processing our refiners, our chemical plants, or sales out into the marketplace. And then there's the other \$50 billion associated with everything else, which is the supply chain I will focus on here. Probably about \$20 billion of it is associated with capital equipment and the construction and maintenance of physical plants around the world, from rigs to refineries and pipelines and everything in between, and then another \$30 billion on the logistics, transportation, additives, etc.

Hydrocarbon is our core business, which is why I would say that when we think of supply chain, it is relatively less important because our number one issue is ultimately our business. But then, when I look at that \$50 billion involving everything else, and I start thinking where in that are real issues, there is the \$20 billion associated with physical plant construction where we are talking about deep water. We're talking about remote and undeveloped geographies, so we have a lot of concerns about the environment, the impact our operations have on the environment and the communities in which we work. Our big concerns, when we're thinking about sustainability in that area, are things like local content and working with local and indigenous communities. And then the second most important area would be in the actual transportation of our products. I probably couldn't even tell you what the direct logistics cost is if you included all the shipping, but certainly billions of dollars of transportation costs associated with the movement of our products.

Our number one source of transportation is shipping. And we were probably one of the first oil companies pushing things like double tall tankers, trying to protect against leakage in the environment, the change out of fuel from high sulfur fuels to lower sulfur fuels onto the seas, and now, looking further at additional equipment associated with emissions in shipping.

Another area that we are pushing is more rail capacity. We have areas that we work where rail capacity is severely constrained. And from various aspects, from a safety aspect, from an impact on the community in which we work in, and certainly from the environmental implications, I'd like to see a shift to less road haulage and more rail transport. The development of more efficient kinds of engine technology is also an area that we are working on. But in general, the amount of distance that we're moving

“Wal-Mart is a great example of a company that, through their leadership position, is taking on the kind of role that we’d normally expect government to take in demanding its suppliers to take on ‘just in time’ kind of inventory management practices, or to show improvements in packaging reduction...”

things by road, and the amount of tanks that we have on those roads is staggering and something we’d like to reduce. Safety is another key aspect in this transition, as our number one most frequent safety incident involves drivers on the road, particularly when we find ourselves in geographies where the roads aren’t particularly well maintained.

We have complex supply chains in other parts of our business as well. In our lubricants business, for example, at one time we were manufacturing 35,000 SKU’s. If you were to extrapolate that and think of the packaging, the labels, the bottles, the storage, the rejects, the lack of efficiency in fill, it just kind of goes on endlessly. And that’s certainly an area where we see benefits from a cost perspective through SKU rationalization. Our customers like Wal-Mart and Carrefour, are pushing for sustainability improvements through packaging minimization, logistics minimization, much more “just in time” kind of inventory management and demand management. There are parts of our business where historically we’ve had tremendous pressure from the government to reduce emissions. But this is a particular area which hadn’t been underneath that pressure, and the pressure to reduce our environmental impact was really coming from our customers. And luckily for us, our efforts here aligned very well with our objectives to reduce the cost of manufacturing – so it was a win-win situation for all.

My personal involvement in these issues is high. Sustainability, I think, is the bubbling, emerging agenda in supply chain management. I sit on the board of ISM, and I sponsored a study that asked: what does a sustainable supply chain even mean, because I think it’s an issue that is still in its infancy and we’re not always sure what people are talking about when we talk about it. I have also been involved in some research here in the UK, regarding how to get sources of data to actually be able to calculate sustainability, such as a company’s carbon footprint, and how one would get verifiable or consistent data, when evaluating suppliers in terms of their sustainable impact?

Another part of our business is alternative energy. So this issue is obviously a high priority in that sector, but overall, at this point in time, I think it is more of an emerging conversation. We’re not all sure what we’re talking about. We’re all in the rush to talk about our green credentials, but I’m not clear what it even means when anyone counts their green credentials. How do you measure those? What’s good? So I find it an interesting debate at this point and one that will grow in importance to my company, but I still consider it to be an emerging issue as of now.

I think that in order for fundamental change to occur in our business, we need a level playing field. We’re all happy to compete, but we’d like to compete on a level playing field. It is the rare business that will take a major step out. I think Wal-Mart is a great example of a company that, through their leadership position, is taking on the kind of role that we’d normally expect government to take in demanding its suppliers to take on ‘just in time’ kind of inventory management practices, or to show improvements in packaging reduction, which is one of the expectations they have on us. And given that all of the suppliers are faced with the same challenge, we’re just fine with that. Of course, this is coming from someone in a heavy regulated product environment, so I’m coming from a distorted perspective. But comparatively, the regulation of my supply chain is pretty light.

Ultimately, I believe that more visibility and sustainability across a company’s supply chain is going to reduce costs. I spend lots of time and energy doing ship cost modeling, trying

to understand my options for reducing costs. What reduces my costs, reduces my waste, reduces my energy consumption, reduces my emissions – these things all work in the same direction. So the more transparency I have, the more opportunity I have to make informed business decisions, and they're only mutually beneficial.

“What reduces my costs, reduces my waste, reduces my energy consumption, reduces my emissions – these things all work in the same direction. So the more transparency I have, the more opportunity I have to make informed business decisions...”

I think we have very complex supply chains today – it's not only a matter of a multi-tiered model, but of globalization. The issues of communication with my suppliers and data are very big issues. There are very few supply chains I work in where I'm not talking from a multi-tier and multi-country perspective. And with no standards, it very quickly becomes a massive data exercise. So pulling this all together when there's very little data and very little agreement on what it is we're considering is a challenge. I also think that the recent volatility in commodity prices is not helping the issue. It makes it very hard to make a business decision, even where you do have transparency, around your various options. It's very hard to make any kind of decision about what you think the forward environment is going to look like. So what would be the most economically optimum answer in one particular scenario and one particular set of forward assumptions about demand and prices may be completely the wrong answer in a different environment.

This conversation is very different in different geographies. So when you talk about Europe being more regulated than the U.S., for example, this conversation gets you no place in Angola. My point is, the issue is very different depending upon where you are, and how the local people and local governments even define “sustainability.” Supplier diversity initiatives in the United States, for example, which in some ways have a lot of similarities to this whole sustainability question, are defined in a U.S. construct. There are very similar initiatives in many countries around the world, but they're called different things. And how they define their objectives are completely different. And when trying to attack this where you have a global supply chain and are running a global business, it's not uncommon to find yourself in a position where what would be the sustainable answer for country X would not be considered the sustainable answer for country Y.

In general, I think this is a conversation that needs to continue. And any efforts to nail some of this down and to provide some guidance are helpful, because I do feel like we're at the dawn of a new era. When I chat with my peers, we're kind of in the same place. It's very easy to grab something and get some headlines and to talk about something, but is it the right thing, and do we really even know what we're talking about? Most of us would say we don't think we do. So efforts to further the conversation, to create a common definition, to rely on ourselves – so at least we're kind of moving in the same direction – I think are relevant, and I certainly support strongly.

Greg Smith
EVP, Supply Chain
ConAgra Foods



“Customer demand for environmental responsibility exists today.”

Environmental responsibility is a high priority for us as a company – and effectively managing our supply chain is a key element. One of the things that we’ve focused on in this area is sourcing – making sure that we’re minimizing our carbon footprint and looking at reducing waste and the amount of materials we use. Packaging for us has been a key area of interest in the primary sell unit, and the finished goods and shipping units. Whether it’s a ketchup bottle or the case that the ketchup bottle goes into, it has been a significant focal point for us as we minimize the amount of materials we use. Another focus area at ConAgra Foods has been energy use in our own facilities and our suppliers’ facilities.

Minimizing the amount of natural resources we use, especially water, has been a significant priority for us as we try to minimize an increasingly scarce resource and thereby be a good corporate citizen in the process. We are also trying to reduce both the number of miles we transport our products and the number of times we touch them across the supply chain. To do this, we think of it as a triangle. It’s most practical and efficient to transport products and materials the shortest distance between our manufacturing plants, distribution centers, and customers, which represent the hypotenuse. Anytime we go into the X and Y axis, we’re incurring more miles and fuel to take product out of one truck, store it and then move it to another truck. So those have been the areas we have put the most energy behind in the supply chain.

Across our manufacturing network, we use an approach that we call the ConAgra Performance System (CPS). The system focuses relentlessly on eliminating loss and waste, beginning with benchmarking, understanding points of loss, and then applying proven methodologies and processes to reduce or remove those losses. We’re using that same approach to manage energy use. For example, if we are using 105 parts to make a product that should theoretically use 100 parts, then it’s going after those 5 parts that represent waste. It’s a matter of efficiency and yield loss. If we are running at an overall equipment effectiveness rate of 70 percent, we could theoretically run at 100 percent. It’s a matter of trying to close the gap between 70 and 100 percent. The same concept applies to how we use steam, electricity and natural gas. All of those elements fall within the scope of what we’re trying to attack.

We’re also looking at ways to reuse materials. As an example we’re looking at how we handle plastic and wooden containers that we use during production and distribution. Now, instead of having one-way trips, we’re looking at two-way trips for the containers. By taking them back, we can rebuild and reuse them instead of using more corrugated that would be recycled but cannot be used as many times. So we’re constantly looking at tradeoffs to try to minimize our packaging requirements.

These strategies benefit us in a number of ways. First, our brands are very important. That’s really where the value of our company exists. Being a good corporate citizen and a socially responsible company on behalf of our brands is obviously good for our business. Customer demand for environmental responsibility exists today. It also helps us better manage costs because it’s always advantageous to reduce waste. This helps us run the business more effectively, which pleases our shareholders. It is also socially responsible,

“A number of our suppliers have been key resources when we’ve worked to find ways to improve packaging sustainability.”

which is something that our employees take pride in. In fact, it is good for all our stakeholders: customers, consumers, investors and employees. We see it as a better way of doing business overall.

There are four or five key drivers that converge to make it a very compelling objective to be environmentally responsible. Cost is clearly a significant factor, but it’s not all about that. There are many factors that come together nicely to influence how we do business.

There’s consumer demand for environmental responsibility based on all of the research we see and drive. In situations where ConAgra Foods has led with technological breakthroughs, we communicate that to the public. We’ve won a number of industry awards around the sustainability of our packaging materials. We’ve received a lot of positive attention in the media around those awards. You’ll see news almost weekly about the things we’re doing – as well what our competitors are working on.

We’ve just issued our ConAgra Foods corporate responsibility report, which is an in-depth summary of everything we’re doing across the company. We use this report to share our wins with suppliers and customers, such as Wal-Mart and Kroger, and even highlight the efforts done in partnership with many of the companies we work with.

We partner with several customers, including Wal-Mart, to share data monthly and ensure both sides are aware of what the other is doing. We have an annual sustainable development conference that takes place in April. Not only do our employees attend, but we also invite several customers. Sustainability leaders from several large and mid-sized companies attend to share what is important to them and what they’re working on. That venue also gives us an opportunity to share our best practices so we can all learn from each other and apply smarter, more environmentally responsible approaches.

We are also enrolling several suppliers in our efforts. As we sign up to address environmental issues that impact our business, we are asking them to do the same. A number of our suppliers have been key resources when we’ve worked to find ways to improve packaging sustainability. In many cases, our suppliers have either been the creators or the co-creators of the technology that we’ve been able to deploy.

In terms of metrics, we are working with suppliers to track water, energy, electricity, natural resources and fuel use, packaging and carbon emissions, among others. Those are the biggest areas we see our partners focusing on, and those are the areas we all need to be focused on right now. We’re looking at, in some cases, what our suppliers and partners are doing with alternative energy. We’re looking at transportation and working with our suppliers to figure out how we can reduce miles and touches in their systems. We’re also working hard in the agricultural segment around water and pesticide use, including how much suppliers are using and benchmarking their use with others to compare yields. We’re also tracking poundage, looking at how we can reduce the amount of materials we use and track year-over-year reductions.

We still have much we can do with our suppliers in this area, but we’re making good progress. We have specifically identified suppliers that have the biggest impact on our business, from those that make ketchup bottles, to those who supply tin or aluminum cans. We are most focused on those that we believe can help us drive the greatest, most sustainable improvements in the short- and long-term.



The biggest challenge we have is ensuring we're doing as much as we can with our more than 20,000 suppliers. For example, we experience more obstacles when partnering with smaller suppliers, which may be less advanced in addressing environmental efforts or may not be prioritizing sustainability issues the same way we are. We're working on it and now we're using environmental responsibility as a component of our buying strategy.

I think the consumer-packaged goods industry, especially the large manufacturers such as Kraft, General Mills and us, is significantly increasing its focus on environmental responsibility. It's been a part of how we've run our businesses for years, but it's clear the amount of attention we've all placed on the environment has grown based on the realities we face today and those we anticipate in the future. The good news is that there's a lot of momentum and the opportunities are great. I'm excited about where we're headed and know that we've only touched the surface of how we can do what's right for the environment and our business.

Steve Ward

Former CEO/Board of Directors
Lenovo/E2open



“This is an opportunity where we can help businesses improve their financial operations and customer responsiveness in a way that also helps reduce energy consumption and greenhouse gases in the process.”

Formerly, I was the chief information officer of the IBM Corporation for a number of years and then the chief executive officer of Lenovo. Currently, I’m a founder of E2open and on the company’s board of directors. I’m also a founder and board member of a company called C3, which is in the business of helping companies monitor, mitigate and monetize carbon. So given what these companies do, I have an interest in the need for improving the environment, which I believe can be done through improved collaboration. This is an opportunity where we can help businesses improve their financial operations and customer responsiveness in a way that also helps reduce energy consumption and greenhouse gases in the process.

Products are becoming more and more assemblies of other products as opposed to a company designing the vast majority of things in its product. Go back 100 years ago and companies made every single part in their product, and then with the automobile industry, that changed as you started to have companies that made spark plugs, batteries, tires, etc., but companies still made the vast majority of their parts.

Another company I’m invested in and spend a lot of time with is a company called E Ink. They make the screens for all of the electronic book readers: Amazon’s Kindle, Sony’s e-reader, etc. Today, a company like Amazon doesn’t make any of the parts. Rather, they select the best screen, the best wireless connectivity chip, the best battery, etc, and then they have someone else design a product by their standards for them. There will always be this range of someone who builds everything, to a portion of things, to somebody who buys all of the parts, but where technology moves the fastest will be in that latter area, and certainly that’s what has happened in electronics. The advantage of this is you end up with companies who get massive scale, which helps lower costs and bring new technologies out very quickly because they can invest more in intellectual property. Another advantage is a smaller number of competitors for each one of the technology items. There’s far less people making wireless chipsets than there are people making laptops, for example. There’s far less people making keyboards than there are people making cell phones, and so on. So you end up in a situation where you still have a sufficient number of competitors to get great prices, but you’re able to take advantage of a much broader footprint in the market for each thing that you need.

Now in order to do that, you no longer have somebody who is building exactly what you tell them to build. Suppliers have their own product cycle which has to be brought together with yours. So you have your cycle of making screens for laptops or cell phones, and if I’m using your product, I need to know that I can buy your product throughout the life of my product. And so there’s a lot of work that has to be done that is collaboration as opposed to what used to be direction: me telling you, “here’s what I want you to build, here’s exactly how it’s designed, now build it.” Now you have to figure out how to build it, how to design it, you convince me to buy it and now we’re collaborating. That changes the scope. It changes the nature of supply chain communication to be much more collaborative going back and forth.

Today, this type of relationship between the supplier and the OEM makes supply and demand processes much more fluid. If my volumes go up and Apple's go down, or Apple's go up and mine goes down, we expect the supplier to work through that demand shift, and we don't get stuck with any cost for reasonable amounts of change in volume. And that's in everybody's best interest because it helps eliminate wasted costs. In order to make that happen, the supplier has to convince all of its customers to use somewhat similar, but not identical, technologies in their products. Once again, it comes down to collaboration. And so the suppliers' job is no longer about "Let me show you what my plant looks like and you tell me what you need built and I'll go off and do a quote on it." It's much more: "Let me show you what I can build and let me bid a price on it based not just on my material and labor costs, but also on my belief that I can get a very high utilization out of my capacity," and so you have less change in costs as your volume shifts.

In order to get that done, that supplier needs to know what's going to happen. They need as much advance notice as they possibly can. If there is an increase in demand, companies want their suppliers to be able to respond to it very quickly, at the lowest possible cost. So we've traded off and reduced capital and fixed costs without losing any responsiveness to customers or any value in large-scale manufacturing. That's a big savings and that's a way that supply chain information and selection of partners can help companies reduce their overall costs. So what was behind E2open's work originally was exactly that thought of "how can we find ways to work cooperatively and create markets that all of us can benefit from?" And what happens is the world will sell a lot more \$400 laptops than \$4,000 laptops. We'll compete on the design of our product, but realize we're now going to be competing with a substantially bigger pie than if everyone's off doing things on their own. That's really where we're going.

A recent copy of National Geographic has a chart that McKinsey and a number of others have been using illustrating how "green" has to start in the home. It shows for more than 100 different corporate, business and personal activities, what the cost is to reduce a ton of greenhouse gases, a ton of carbon dioxide or a greenhouse gas equivalent. By far the most effective thing for someone to do is to replace CFC light bulbs with LED light bulbs, and that will save you about \$100 for every ton of carbon that you reduce. So you're using less gas, you're reducing a tremendous amount of carbon and you're saving money because of just how little it costs and how much energy you save. The single most expensive thing you can do is buy a hybrid car. I have a hybrid car. It turns out that the additional cost of a hybrid car is about \$100 for every ton of carbon that you're going to reduce. And a ton of carbon on the futures exchange is worth somewhere between \$12 and \$40 depending on what happens to the price of oil, so you're paying four to eight times what the market says it's worth.

There are lots of different things that people can do and you realize that there's a huge amount of opportunity. People need to recognize that they can improve the efficiency of their business operations while reducing greenhouse gases. And most of the things they can do will in fact make them more profitable companies, including the cost of implementation. So I think there is becoming more and more recognition that adopting new, energy-efficient technologies is going to be like everything else you're more efficient at – it's going to be profitable, and there are a lot of companies that are very interested in that. If you look at the number of companies that have assigned chief environmental officers, it's increasing and that's a positive sign. Now there's the second half of the chart

"I think there is becoming more and more recognition that adopting new, energy-efficient technologies is going to be like everything else you're more efficient at – it's going to be profitable, and there are a lot of companies that are very interested in that."

which is all those things that cost a lot of money to reduce carbon, and then the question is what is the value of reducing carbon? Well, one value, of course, is the petroleum, electricity, etc. that you don't use, so that's a cost savings.

Another value is the brand positioning that you get with consumers, but also the brand positioning that you get that gives you permission to do certain things. You may have the ability to bring more reliable electricity to your manufacturing plant because you agree to do something that helps the power company. A number of years ago when California was having power outages, a large semiconductor company based there volunteered that they would be the first company that would turn off their air conditioning, shut down all their lights, etc. Whenever PG&E said there was a power outage coming, they immediately shut everything down in their offices. But in exchange for that, they made an agreement that their semiconductor plants would be the last thing that was shut down. So here's an example where a company is realizing that it gets some brand permission to do things because of its environmental consciousness.

And then the last piece is that it's going to become law. And whether it becomes law in terms of taxes or in terms of cap and trade, which is what's been done with sulfuric acid, acid rain and ozone-depleting gases, either one of those is going to implement a cost to releasing carbon. That will make these things that save money for every ton even more effective and it will make the things that cost money at least break even. So you end up with a stream of ways we can save money just as things are today: we can improve our relationships with others in the community and our customers and finally that there's coming a time when we will have to pay for this type pollution like we do with anything else. We just simply need to be able to eliminate it or reduce it in order to continue to have a profitable business.

In terms of which industries are at the forefront of this issue, that's going to change with time as there is a change in value management. There are three pieces to this: first, is that I firmly believe that the design of a supply chain and product structure that uses other company's products, as opposed to one-off designs, is a major savings because you're sharing facilities. Frankly, offices and factories are kept warm whether they're being used or not, so the more hours you can use something, the better off you are. Anything that you can do to increase utilization is going to help. Secondly, is that there are a lot of companies in a number of industries – you're seeing a lot of it advertised in the electronics industry – where companies are becoming very driven by green designs, both because consumers are demanding them and because it lowers their costs, either the cost of future recycling or the cost of manufacturing up front. You're seeing more and more people talk about the green nature of their design.

Three or four years ago at IBM and Lenovo, customers would talk to us about ways that they could remotely disable those aquarium screensavers that everyone used to have. If I remember right, the cost of electricity to make those run 24 hours a day rather than letting the computers shut off was between \$50 and \$100 per machine per year. So people have been thinking for several years about ways to reduce energy through the operation of a finished product. That, of course, changes customers' perceptions. With the Amazon Kindle, I mentioned the screen before, which uses extremely low energy. You charge the battery usually once every two weeks on this very small electronic book and that changes people's perceptions of what things should be like. Consumers like the advantage of low power and, of course, a product that uses less energy is greener. So I

“Collaboration simplifies the issue of sustainability across the supply chain in three ways: what’s the design of the supply chain, how are the parts physically made and how efficient is the motion of the parts...”

think the electronics industry is at the forefront of this issue. You’re also seeing a lot of it in certain parts of equipment. United Technologies, for instance, is making headway with their redesigning of elevators to basically make them hybrids – they retain the energy of a downward move in order to balance out an upward move. So we’re beginning to see a very aggressive move throughout industry, especially in larger companies.

Collaboration simplifies the issue of sustainability across the supply chain in three ways: what’s the design of the supply chain, how are the parts physically made and how efficient is the motion of the parts, not just in the nominal design, but also with the extreme cases where things need to happen quickly. In addition to how companies are designing their products, there’s also how companies are selecting their partners in their supply chain – but companies are just now beginning to think that through. What’s most important is the manufacturing process: how things are made, what is disposed of, what chemicals are released, etc.

And then the very last piece does come down to transportation. The difference between parts that are moved in a couple days via ship or rail versus parts that are flown is a massive amount of energy, and that has a lot to do with responsiveness. Unfortunately, if orders come in a large lump and you can’t respond to it, you may be in a position where you need to ship things more rapidly in order to meet those customers’ demands. Having better communication can allow lower costs and substantially lower energy use, and that’s another reason supply chain collaboration is so important.

The single biggest challenge companies are facing is developing a strategy for real-time supply chain collaboration. Getting all of the stakeholders involved to agree on a common language and a common set of processes is near impossible, and that’s where solution providers like E2open come in – to build into companies’ systems some very key processes that allow people to work and collaborate more easily. Companies need to have a management system where they know what things they’re going to collaborate on, which things they’re going to respond to and which things they’re not going to respond to. In any business there’s orders changed every minute of every day, and if you try to respond to every single thing that happens, it gets out of control. Instead, a good design allows companies to respond to things three times a day, once a day, or four times a week depending on the process of the company.

So developing the strategy, achieving alignment across the suppliers and then deciding on what the limits of your operation are, are all important and can be done with management leadership and software. The next key is to create incentives to motivate your suppliers. You need to find things that are mutually profitable for you and your suppliers. It makes no sense at all to put changes in effect that basically just push a problem from one layer to another. So that’s the next key piece – bringing everyone together to cooperate and coordinate.

The last challenge involves development. Providing that you think about the supply chain very early in the process, when the product is first designed, it comes together easily – and I would say most companies do that today. That wasn’t the case eight or 10 years ago, but today, making sure that information about environmental effects and supply chain effects is available to the engineers who are deciding what parts they are going to use is an extremely important element if you’re going to achieve the absolute best product delivered efficiently to customers. That’s exactly the reason we formed C3,

“For companies just getting started, the very first thing they need to do is to make sure that the communication and collaboration infrastructure is in place – the framework and the capability - to communicate back and forth with every stakeholder in your supply chain.”

because that's very hard to track. It is much more complicated than just what's everyone's electric bill, and there really haven't been any good products to do this kind of tracking yet. Companies are starting to express the need to look at the biggest possible carbon footprint on a very frequent basis so that they're able to make operational changes, but we're very early in the ability to get that done.

From a measurement capacity, the utilities are very advanced, because that's what they do. Europe is more advanced than the United States because they have some requirements to do reporting and those requirements end up putting a certain timeframe around how quickly you can do that reporting. But if you look at the total scope, we are just beginning to scratch the surface on the efficiency that's possible as we look at energy in a discerning light.

For companies just getting started, the very first thing they need to do is to make sure that the communication and collaboration infrastructure is in place – the framework and the capability - and that's not just the ability to send documents or emails back and forth. That's the ability to work in a very structured process to communicate back and forth with every stakeholder in your supply chain. Certainly, that's what E2open's solutions allow companies to do. Before you can get everyone to work well together on a systematic basis, you've got to have people communicating. That's the number one thing that needs to be done.

The second thing is to define – which some will come by industry and some will come by government depending on where they are – what needs to be looked at from an environmental standpoint and attach that data with the rest of the information about your product. That's a much bigger challenge.

Then the third thing is to define the scenarios where increased environmental damage comes with increased costs. That's not always the case, but in general that's the case, and what are the scenarios that create that and then how do we put processes in place to reduce those? So very simple things, for example: shipping products in very large quantities takes a lot less material than shipping smaller quantities; shipping products on more efficient rather than less efficient types of transportation; and manufacturing processes that take into account environmental and carbon waste. Those are three things companies can do to get started: get people communicating together very well through the right sort of infrastructure; understand the design of the footprint that you're trying to go after; and then looking for ways to improve efficiency and eliminate waste in their operations.

Paul Comey

VP, Environmental Affairs
Green Mountain Coffee Roasters



“...environmental programs can have a positive effect on the bottom line, not the negative effect that so many people typically think they’re going to see.”

As a coffee importer our supply chain is fairly long, consisting of thousands of suppliers from approximately 20 countries. The majority of our growers are in Sumatra, Indonesia, Africa, Central America and South America. Then we buy most of our manufactured materials from China. Given what they have to work with, we’ve see some of our farmers, specifically in Central America – places like Costa Rica, Guatemala and Mexico – making good strides in being forward thinking around environmental issues. We are concerned about environmental issues at all different levels of our business, particularly on the coffee farms, as we have direct contact with many of our growers. We purchase a lot of organic and fair trade coffee, so we use those certifications to try to help us better understand our supply chain. We also encourage segments of our supply chain to become certified under those criteria, although there are some that can’t because they are not co-op owned. So we try to work directly with those folks to see what they’re doing around good farm management. Then from that point on we look at all of our material suppliers, whether it’s packaging material, board or corrugated paper, and we look to see what our suppliers are doing both environmentally and socially. We have a screen that we’ve put in place and we’ve started to interview our suppliers to qualify them. There are not any specific policies that we enforce with our suppliers – we’re just trying to encourage our supply chain to move in the right direction and show them that to move in that direction can be cost effective.

Keurig manufactures its single-cup coffee brewers in China. Our engineers are in their factory on a weekly basis, conducting analysis of their operations, specifically from a social and environmental compliance point of view. Then we also work with our more local suppliers. Sometimes we’ll actually encourage a supplier to walk down a road that’s more environmentally friendly or partner with them. Some good examples would be where we’ve requested our film suppliers to make their packaging film more eco-friendly. Companies like Fres-co out of Telford, Pennsylvania came and introduced a polylactic acid, a PLA layer of film, making 19 percent of their film from a renewable resource. We strongly encourage that and the product has since become available. We jumped onboard and integrated that into all of our packaging products in the 10-12 ounce line. We’ve partnered with people like International Paper and requested that they come up with more environmental friendly products. They approached us and said that they had on their drawing board a paper coated cup with polylactic acid instead of polystyrene and we agreed to launch that product with them because they needed somebody that had enough volume to make it viable. We brought that nationwide a couple years ago and we still continue to carry those cups. We purposely did not take an exclusive position on it because we felt it was a product that was good for the environment and wanted everyone to be able to share in it.

Another thing we’ve done recently has to do with the corrugated boxes that our inbound materials come in. Rather than recycling them, we actually take those boxes, cut them down flat, band them, fill a trailer full of them and then sell them to a reseller so they can be used again as boxes. We actually generate cash from that. We share these types of efforts with our suppliers. We show them how we take materials that most people consider to be on the negative side of the balance sheet because they have to pay to haul

“We have been measuring our carbon footprint since about 2001 and we’ve been mitigating it through renewable energy credits since 2002.”

them away and find value in them. By doing that we hope to encourage our suppliers to be able to take part of their waste stream and turn it into a positive cash flow, once again showing that environmental programs can have a positive effect on the bottom line, not the negative effect that so many people typically think they’re going to see.

There are other materials that we used to send to the landfill as well, like chaff, which is a byproduct of the roasting process. Now all of that material goes to the compost site instead of the landfill. Last year we diverted approximately 400 tons of material from the landfill to the compost site and by doing so reduced our tipping fees, because the tipping fees at the compost site aren’t nearly as expensive as the tipping fees at the landfill. We’ve also sold all of our shrink wrap as recycled material. We converted our fleet from diesel to B20 biodiesel, which has resulted in less carbon impact, better mileage and cleaner burn. We’re in the process of putting a 100,000 watt solar array on the roof of our distribution building. That specific array because of the tax laws from the federal and state government has an internal rate of return of 20 percent.

We partnered with a company called Efficiency Vermont, which is actually a utility in the state of Vermont. Vermont is one of the few states that have a utility that doesn’t generate power, but their focus is to reduce energy consumption. There’s a 2 ½ percent tax on all of the electric bills in the state. That 2 ½ percent is given to this public entity, Efficiency Vermont, and they in turn reward customers for taking steps to reduce their power consumption. So by re-lamping our entire plant – taking all the high intensity discharge lamps out and putting in high output fluorescents – we spent about \$28,000. They gave us about \$6,000 to do it and the return on investment only took 13 months. Then every 13 months we’re seeing a \$20,000 decrease in our electric bill. So we try to share things like that with our vendors to show them that a lot of times you’ve got to spend some money to save money, but the return on investment is extremely high.

We have been measuring our carbon footprint since about 2001 and we’ve been mitigating it through renewable energy credits since 2002. We measured scope one and scope two and we measure scope three right now all the way back to our outbound freight as it goes to our consumer, our business travel, as well as all employee commuting to and from work. So we’ve been expanding the scope of scope three in a sense, as we start to look at our vendors offsetting our inbound freight. Then hopefully after we’ve done this long enough we can turn to our vendors and say, ‘We’ve been mitigating your carbon footprint for years. It would really make us feel good if you would mitigate your own carbon footprint.’ So it’s a lead by example model and we’re doing it to show folks that you can do these things and be profitable, and make business a change agent. We just got done awarding \$800,000 worth of grants under our climate change initiative. We had four grant awardees that will get 40,000 a year for five years to work on climate change and what can be done to reduce greenhouse gas, and then come and report back to us twice a year and work with us on what we can do to reduce our own carbon footprint.

Environmental and social responsibility has been part of our fabric for a long time. We’ve been giving five percent of our pre-tax profits to social causes in the community. The founder of the company was a big believer in it and was the first one to say, ‘You have to lead by example.’ He stepped into the Chairman role a couple years ago, but Larry Blanford, our new CEO, is a believer in the same philosophy so it’s more of the same. We do get some good consumer recognition. Although it doesn’t necessarily drive us, there is a segment of the population out there that does see us as a green company. There are

“Our purchasing department is very aware of our corporate philosophy and vision. So they’re a great place to be able to start to leverage a green supply chain.”

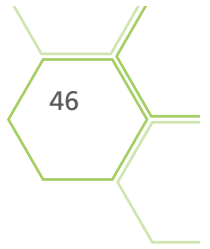
some investor groups, such as Trillium Asset Management Group, that watch what we do because of what we do from an environmental/social point of view. Organizations like that see us in the “green fund category,” if you will, but we really see ourselves primarily as just a high quality product with great customer service that tries to do the right thing.

A lot of what we do is just good business. You take a firm that hasn’t been very conscious of sustainability and if you’re lucky they’ve put somebody in an environmental role and you’ve got someone to speak to. If you’re not lucky they’re just business as usual and really don’t have any desire to go down that road. They’re too busy, too strapped, and too tight. So you’ve got to find the right partner to be able to work with. It’s not for everybody and because we do not try to force it on others, we really look more to find out who the right partners are. A company’s environmental and social stance is taken in as one of the criteria that we look at as we compare people that let’s say are bidding on a product or something. Our purchasing department is very aware of our corporate philosophy and vision. So they’re a great place to be able to start to leverage a green supply chain. Even our suppliers are more aware because we now ask them to fill out a survey with questions about sustainability efforts when they’re bidding on a product.

People in the paper and packaging industry seem to be onboard, whether it’s certified box board, certified paper or packaging materials. One of the down sides of the coffee businesses is that our product is extremely perishable. The enemies of coffee are moisture, daylight and oxygen. When you produce a package that keeps out those three you’ve also produced a package that’s pretty unfriendly to the environment. About the only place it’s going to be able to go is to the landfill or better use in my opinion would be waste heat recovery for electrical generation. So I think people in that business really try to clean up their image by doing as much as they can from an environmental point of view. They know they’ve got a product that’s not the friendliest so a lot of the people make that extra effort to green up the perimeter of their business, if it can’t be done with their base product. Then you get people like the Fres-co Corp. where they are actually willing to go further and start to substitute biopolymers for petroleum products. I think people are seeing that the handwriting’s on the wall and you’re going to see it keep moving in that direction, which is why you don’t really need to force people as much as you need to share with them things you’re doing that work for you.

Anytime you get an ROI that’s less than two years it’s probably the right thing to do. So any time we can take a supplier through our warehouse and show them how re-lamping the warehouse basically has a 13-month return on investment, those are the kind of things that just make good business sense for people. You don’t need to pitch that as a green initiative. You need to pitch it as good operational practices. That’s kind of the crust we try to come from: if you really look at good operational practices you’ll be able to do a lot of things that would also be good environmental practices. The landscape has definitely changed out there over the past decade.

I think as you become a larger corporation the last thing you want to do is find yourself on the front page of a newspaper some day because you didn’t have enough visibility into your supply chain. You can go back to the Nike days and the garment and shoe industries and what happened and that’s the last place you want to be. So it’s to everybody’s advantage to start to understand their supply chain so that you never get into a situation where you’re put on the front page of a paper because you didn’t know about it. The same thing comes around as you look at things like carbon trading. If you figure there’s a



good chance at some point that this administration may put some sort of carbon trading tax in place, the more you understand your carbon footprint, the more you'll be ready if that ever happens. So companies have to think of it as risk management, in a sense.

From a selling point of view, environmental initiatives are very small part of what we do. We develop an annual corporate social responsibility report, so we're very transparent about what we do. In fact, you can go to our website and see most of what we're doing, but we keep a pretty tight rein on the marketing group and any type of claims they want to make. A good example would be that our paper cup is technically compostable. It's passed the BPI standards and it meets ASTM 6400-99, which means it's compostable in a municipal compost site, but since there are very few municipal compost sites in the country, we don't go out there and call it compostable because there's just not that many sites people can take it to. But we do refer to it as made from renewable resources. So we try to work very closely with the marketing group to make sure that anything they say is very accurate.

Tim Mann

Manager, Environment Product & Process Stewardship, Corporate Environmental Affairs – IBM



“We want to develop suppliers for longer term relationships, and we think they need to have programs in place to achieve operational efficiency and effectively manage environmental issues in order to be viable as long-term businesses.”

IBM has a well-defined environmental management and corporate responsibility program with our suppliers. We have supplier conduct principles, as well as requirements that we put on our supply chain. We are a member of the Electronic Industry Citizenship Coalition (EICC), which has a supplier code of conduct that our corporate principles are in alignment with, so we do promote good supply chain, environmental and social responsibility practices with our suppliers. In addition to our supplier principles, we also have a very extensive audit program in place with our suppliers. We promote the development of environmental management systems and a number of other important related issues with our suppliers.

At the end of 2007, we had conducted over 450 audits with suppliers in 12 emerging market countries. The audits are conducted by third-party agencies with local personnel who specialize in social responsibility. If you look at our latest corporate social responsibility report, some of the key topics that are discussed concern health and safety, working hours, wages and benefits, respect and dignity, communications, record keeping, nondiscrimination, environment, child labor, forced labor, freedom of association and ethical dealings. In the report, we actually provide the results of those initial 450 audits and rank a percentage of suppliers that comply with IBM’s code. It also includes information on numbers of suppliers that had what we would call minor noncompliance issues, which would typically be something like paperwork or a particular document they couldn’t produce when we expected it, as well as information on the numbers of suppliers that had what we would call significant noncompliance issues. For example, where a supplier did not have a required program in place at all. It’s a continuing program, but we don’t have the results from 2008’s audit yet.

While our audits don’t change a lot year to year, there is obviously more focus today in our supplier evaluation programs on things like climate change. That is a very high profile subject today. IBM is participating in the Carbon Disclosure Project Supply Chain Leadership project. Under that program, we are encouraging some key suppliers to report their greenhouse gas emissions under the Carbon Disclosure Project.

It’s important for us to understand that our supply chain meets certain basic sustainability principles. In addition, we need more information on certain types of suppliers. For example, where we have suppliers that dispose of hazardous waste or where we have suppliers that conduct recycling operations for end-of-life IT products on behalf of IBM, we perform an on-site evaluation of these suppliers’ facilities to ensure IBM selects suppliers that are both responsible and competent in carrying out these activities. Our hazardous supplier evaluation program dates back to 1972, while the evaluation program for recyclers was initiated in 1980.

We’ve also recognized that it’s in our interest and in the interest of our suppliers that they have programs in place to conserve energy and we want to promote that within our supply chain. It helps their business performance, which ultimately helps our business performance. So that’s an area we encourage them to focus on. We encourage them to understand their own emissions and do what they can to reduce them. We want to make

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sure that their business is one we want to do business with, but also that they’re going to be in business for a long time. We want to develop suppliers for longer term relationships, and we think they need to have programs in place to achieve operational efficiency and effectively manage environmental issues in order to be viable as long-term businesses. So from that standpoint, we understand the benefits of being a leader in the environmental area, as well as the social responsibility area, and I think we want to bring our suppliers along with us wherever possible so that they can also improve their operations. This ultimately helps us have a stronger supply chain.

Our suppliers are expected to comply with laws and regulations and have the appropriate environmental controls in their organizations. I think that’s a fundamental requirement of doing business. If you do business with people who don’t have those controls, there’s always a risk of them being shut down or some other forms of distraction, which would interrupt your business. So you want them to have the fundamental programs in place. There is also the recognition that if a supplier reduces their energy use and becomes more efficient and saves money in the process that can only benefit their customers and hopefully reduce the prices for the things that they buy. So obviously you don’t want to do business with inefficient enterprises.

One of the things we do internally is track our environmental expenses and savings, and historically we have seen that our savings far outweigh our expenses. We believe that being a leader in managing environmental issues as helping our business not hurting it, and that’s the way we look at our supply chain as well. It’s really a matter of making our supply chain more efficient. Pollution is waste and waste makes for an inefficient supply chain. Of course it’s more difficult in the current economy to get capital for major projects than it was a few months ago, but at the same time, reducing energy use and lowering your greenhouse gas emissions saves money, so it is something that is worth the investment in the long term.

It’s very difficult to come up with what I would call a standardized metric for measuring a supplier’s effectiveness in managing its greenhouse gas emissions. You may be looking at two companies that sell a similar product, but they may have vastly different manufacturing models. One company may do final assembly and then another company making the same product may do a lot more of the manufacturing of components. It’s very hard to take a number for something like greenhouse gas emissions and compare it across companies because you really don’t know what’s included. You don’t know the extent to which that company has outsourced and how much of the total is actually in those numbers. So scoring our suppliers and ranking them on their greenhouse gas emissions reduction efforts is not something we do today. At the end of the day, what you want to know is what are the opportunities an enterprise has to reduce its emissions and what is it doing to capture that opportunity and produce real results. So as a first step we are focusing on figuring out how much of our supply chain actually measures and is capable of reporting on their emissions.

We’ve had a significant amount of focus on the outbound distribution and the logistics operations of the supply chain, at least from an environmental standpoint, the primary reasoning being that’s something that we have more control over. We influence distribution through our sourcing decisions, through the locations of our facilities, through our selection of modes of transportation and delivery schedules and things of that nature. Our other major supply chain focus is anything that will affect our ability to sell products,

particularly with production suppliers where we buy components and parts that are included in our own products. We have a major focus on understanding the materials that are used in components and parts that we purchase and whether they contain banned or hazardous materials.

When you talk about having complete visibility across the supply chain, that's a daunting task. Our industry has one of the most complex supply chains out there. In terms of the kinds of products that we manufacture, we have literally thousands of components and parts, a large percentage of which come from the supply chain. We have a very, very large supply network and it is multi-tiered. In addition, these suppliers are in all types of businesses and very few, if any, work solely for IBM. Indeed we are typically a very small portion of any given supplier's business. I'd honestly say we're probably a good ways from having complete visibility across our supply chain – but I don't think any companies are there at this point in time. I think the industry has made a lot of progress in promoting ethical conduct in the supply chain and promoting things like the EICC code of conduct, but I think we're a bit further away when you're talking about understanding pollution emissions or greenhouse gas emissions of a specific supplier three levels down. I'm not aware that any companies have achieved that today.

One of the most important things companies like ours need to do is promote the development of environmental management systems within their supply chain and make sure that their suppliers have environmental management systems and processes within their companies. Why? If all companies in our supply network have a sound management system and every company takes responsibility in addressing their own impacts, the end result will be that we will have a more efficient supply chain that has a lower environmental impact. IBM has maintained a global environmental management system (EMS) for nearly three decades and has certified it against the ISO 14001 standard since 1997. Our EMS has served as the foundation for all that we do in environmental management, and it has enabled us to achieve continual improvement. While we don't have a requirement that our suppliers certify their EMS against the ISO 14001 standard, we do encourage the development and implementation of environmental management systems. Based on our own experience, I believe that's a good way of pushing better environmental performance through the supply chain. We also continue to expand some of the programs within the EICC. The EICC has a group that is specifically looking at greenhouse gas emissions and whether there are tools and other kinds of things that can be provided to help suppliers in assessing their greenhouse gas emissions and understanding opportunities for improvement. Most of our programs are geared toward assisting suppliers and helping them improve their performance because that's what ultimately will deliver real results as opposed to trying to calculate numbers for what they do.

Senior Director of Procurement Strategy
Globally-Recognized Food & Beverage Company

“We definitely feel we have a responsibility to our shareholders, our customers and our employees with regard to our environmental, social and economic impacts.”

My role is head of strategy for procurement. A large part of that responsibility is sustainability and there are several things we’re looking at right now within our organization. We’re trying to make sustainability part of every business process and decision and we want to use it to leverage our ability to grow the business and to drive cost savings, as well as make sure that we proactively manage our natural resource base and reduce the impact on the environment.

So one of the things we’re doing within procurement is making sure that our suppliers have corporate and social responsibility as part of the way they work and operate. We have to work closely with our suppliers and ensure that they are doing the right things around labor, environment, health, safety and business integrity. And so we’re asking our suppliers for a lot more information than we have before. The other element is we want to make sure that we understand our supply chain and where our products are being sourced from to ensure that we’re driving down costs, driving out waste, managing risks and minimizing the impact on the environment. We’ve done a lot of research and reaching out to our peers recently to look into sustainable sourcing practices, and we’ve found that many companies are at the very early stages. We have a vested interest in working closely and actually having transparency with our suppliers around these areas.

For example, we have a program called PROGRESS, “Program for Responsible Sourcing,” and we’re working with our peers in the industry to develop and standardize this program to enable a more efficient process that could be used across the whole industry. PROGRESS involves a self-assessment questionnaire around labor, environment, health and safety and business integrity. We then do a risk assessment: scoring those answers to determine who is at risk as it relates to corporate and social responsibility. Then we work on an audit protocol and a corrective action plan with our suppliers to try to help them improve. So it’s really a matter of trying to get our supply base into thinking and acting around CSR in a more proactive and visible manner.

The challenges we’ve faced in rolling out a program like this is first and foremost awareness about what we’re doing and why it is important. We have a lot of global suppliers and source a lot of materials from all over the world. Many of our suppliers are small companies and are not familiar with the purpose of these assessments. The second piece is around their capabilities in terms of even having web access or speaking and understanding English, so there’s a whole communication and technology aspect that has to be dealt with as well. And then the third piece is resistance or potential resistance around the cost and the time it takes for suppliers to participate in programs like this.

We are measuring our reduction in waste, water, energy and packaging internally. We have established associated baselines and are measuring improvements. We want to incent our suppliers to help us deliver our goals in this area. And we are working hard to extend our understanding of our full supply chain, both upstream and downstream in terms of carbon, water and land.

“Once a company defines this as a core mission and value, it needs to look at how sustainability can help grow its business, reduce costs and become a true business strategy.”

We definitely feel we have a responsibility to our shareholders, our customers and our employees with regard to our environmental, social and economic impacts. So we have made this one of our missions to make sure that we are helping the environment as well as helping our business to drive sustainability. As far as how the industry in general is doing, I would say ‘variable’. Many companies don’t know how to do some of what we’re talking about because it’s never been done before in a consistent manner. We are currently working with some organizations, like the Bill & Melinda Gates Foundation and the Rainforest Alliance to promote good farming practices and help build sustainable supply chains in key sourcing regions. Cocoa, cashews and coffee for example are some key areas in the food business where we need to ensure that there’s long-term viability for the farmers and for the environment in the areas around the world where we buy those products.

Once a company defines this as a core mission and value, it needs to look at how sustainability can help grow its business, reduce costs and become a true business strategy. Companies need to have the right resources with the right focus, and small wins so people can get excited and will get behind the effort: until you have some concrete examples about how to do any of these things, it can be difficult to get people energized. Companies also need the right tools because a lot of this information does not exist in one place: all this requires a lot of research and talking to peers.

On the growth piece I mentioned earlier, sustainability needs to be part of our business growth strategy. Consumers are becoming more educated and I think once consumers start demanding this, then a lot of companies will get in line. Every year we’re getting better and better but I think we’ll really accelerate when all of our business units have this incorporated into their strategy.

Jennifer Hughey

VP, Supply Chain

Electrolux Home Care Products North America



Electrolux Home Care Products North America manufactures and markets more than 130 vacuum cleaner models under four brands: Electrolux, Sanitaire, Beam and Eureka. Our parent company, AB Electrolux, is based in Stockholm, Sweden and manufactures all of the other major appliances, so I manage the supply chain for the vacuum branch of the company based in the States. There's a lot of work going on at the corporate level to gather information and assess where we are as a company. When we look specifically at the supply chain, we're looking at our carriers and what kind of transportation we have coming inbound and going outbound, what we do in our distribution centers, what we do in our factories, etc.

We've been working on making our operations as green and sustainable as possible for the last few years now, but we're really just starting to dive into this issue in regards to our supply chain because there are so many aspects to look at. In addition, we're also looking at how sustainable our products on the market are, our packaging and things like that. So far, it has been a challenge getting a lot of information from our OEM suppliers about their sustainability efforts.

We source about 75 to 80 percent of our products from suppliers in China and we manufacture about 20 to 25 percent of our products in our factory in Juarez. We have a few products that come from Hungary, but for the most part the majority of our finished products come from China. We have longstanding relationships with most of our ten key suppliers, who we work with for finished goods products. We source a lot of components from about 100 suppliers in the Far East as well, but for our finished goods, our vacuums, we only have about ten major suppliers.

In terms of our products, we've had success with a couple of units that we have touted as being environmentally friendly. We have the Eureka EnviroVac which uses less energy than a standard vacuum, for example. The research out there, however, is showing that although consumers are interested in sustainable products, they are not necessarily willing to pay a premium for them – at least not yet. Generally speaking, I think the recent economy is making this fact even worse. Nonetheless, we still continue to sell a good amount of our EnviroVacs, but I think consumers' unwillingness to pay more for a green product has compounded recently due to the economy.

There are a couple of different ways to look at the issue: the actual product itself, the packaging and the different materials in the product. A company can claim their product is green, but then the actual manufacturing process is a whole different story. For us, with the EnviroVac, it's really more about the material used, the packaging, how it's designed and the energy that it consumes.

Besides the product side of things, there are also a few key things we're doing in the supply chain to be able to market our green efforts as a company. We partner with Dunlop who does all of our outbound logistics and they are part of the EPA SmartWay Transport program, so we're able to use the SmartWay logo and branding in our marketing. We also conduct a reverse logistics recycling program through our distribution center in El Paso, Texas, where we recycle any products we can't remanufacture.

“Our parent company in Stockholm has set goals to reduce energy consumption in our factories, distribution centers and transportation, especially in areas like container freight inbound transportation...”

Our parent company in Stockholm has set goals to reduce energy consumption in our factories, distribution centers and transportation, especially in areas like container freight inbound transportation, but it's more on a global, corporate level. They're gathering a lot of data to analyze and see exactly where we stand compared to other companies across the globe, and from there can set goals to reduce that level year over year and reach a specific target by 2012.

There are small things we are trying to do that I believe will eventually equate into bottom line savings. Things like making our boxes smaller so we can fit more boxes on a container and more containers on a truck going outbound – these are things we're always looking at and working on but again it's a fine line between making the boxes too small and making customers exert too much energy to put a product together versus making the product bigger and more of it already preassembled. It all comes down to what consumers are willing to pay for and do.

I think we definitely have a responsibility as a brand-name company to be as environmentally friendly as possible in our corporate offices, our factories, our distribution centers, wherever we can. After two or three years of working on this, I think we finally have the right people and strategies in place to really start driving these changes throughout our global company. We are just in the beginning phases of auditing ourselves and finding a baseline where we can start from so we can understand if we are improving and how we can continue to improve.

Tom Dadmun

VP, Program Management Office
ADTRAN



“We’re trying to figure out our own carbon footprint because at some point we know we’ll be asked to do that, and so we’re trying to prepare and be ahead of the curve.”

I’m the vice president of the program management office here at ADTRAN, and am responsible for putting together the enterprise architecture for the company. But I’m also the “green,” CSR spokesperson – the person responsible for our policies on corporate social responsibility, which includes green initiatives. We’ve designed our framework into five major areas around CSR: first, are products; second, is the supply chain; third, is the workplace; fourth, is the workforce; and then underneath it all the fifth section is governance, the strategy and the policies that we have developed for CSR. We’re looking at corporate social responsibility not only from what we need to do in the environment and the community to make sure we have a sustainable business, but we’re also looking at it from a product point of view where our customers are asking us more and more how our products fit a sustainable blueprint that would include energy savings, power reduction and eco-friendly products. So we’re attacking it from many angles.

In the first dimension on products we’ve asked our A-class customers what they expect from suppliers that are eco-friendly, and have put a template together of what we think that is. We’re continually working with them in different forums. For example, we sell to carrier companies, such as AT&T, Verizon, Qwest, etc., so we also tie into an industry forum called ATIS, which is the Alliance for Telecommunications Industry Solutions. We’re working with them to come up with green standards for the telecommunications industry that extend beyond our products and into our supply chain – to our suppliers and suppliers’ suppliers. We have scorecards for our suppliers to fill out that tell us whether or not they’re eco-friendly and have green initiatives going on. Within the supply chain, we also look at our logistics practices. We’re trying to figure out our own carbon footprint because at some point we know we’ll be asked to do that, and so we’re trying to prepare and be ahead of the curve.

That covers our products and our supply chain. In terms of the workplace, that’s really around what we are doing from a facilities and IT point of view to make ourselves more CSR viable and energy efficient. Of course, from a facilities point of view we’re doing the obvious recycling campaigns, replacing light bulbs with more energy-efficient ones, having energy management software applied to some of our power equipment, as well as setbacks on our heating and lighting in the building. We’re also doing some equipment replacing in the IT arena with monitors replacing cathode ray tubes, virtualization of our servers, etc. And then from a workforce point of view, we’re trying to get more eco-friendly with streaming video conferencing as opposed to flying around the world for all these different conferences. So we’re using VPN more, video conferencing, things like Telepresence by Cisco that a lot of people are familiar with. And we’ve also installed VPN solutions in a lot of our employees’ laptops so they can communicate from home and telecommute more. We’re celebrating Earth Day here at ADTRAN this week with some booths in the cafeteria during the afternoon and we’re challenging the employees to come up with 100 suggestions this month as to how the company could be greener. We want the employees to be involved and feel empowered.

The fifth dimension is the strategy and governance, and I have a GCOM, or a green committee for communications that puts out a newsletter every month as far as what's going on at ADTRAN from a green, corporate sustainability and social responsibility perspective. We're about to come out with our first CSR report this fall. We've included CSR in our annual report, but we're really challenging all our different functions to put together standards and goals on reductions or increases in productivity around these areas so that we can come out with a CSR report later in the year in the opposite cycle of our annual report. We're also trying to work with the Chamber of Commerce in Huntsville as well as two or three universities in the area to understand what they are doing from a green perspective – how can we tap their knowledge and experience on what they're doing as far as best practices go. We presented a plan to our senior management last month that included the first ever forum in Huntsville on green practices that we hope to host here in the fall at the ADTRAN campus.

Sustainability programs don't require that much education or selling to our suppliers because a lot of them are being challenged by other companies as well. When we deal with suppliers, we're looking at our A-class suppliers, like Arrow and Avnet, to see what their sustainability programs are because most of those companies – what I would call tier-one suppliers – already have their own programs in place. We also outsource some of our products to Jabil and Celestica, which are two tier-one EMS providers. They have their own sustainable programs as well. So many of the folks we deal with at what I'd call A-class or tier-one level partners already have programs in place so we're just learning from their best practices and making sure that they're doing things that would warrant them on our A-list from a scorecard perspective.

Now, as you get into our scorecard in procurement, to be honest with you, we're at the very embryonic stages of putting together what the standards should be and how we measure suppliers against that. I think there will come a time when that would be a key ingredient as to whether or not we buy from them, but at this point we're not anywhere near that type of a strict requirement or governance model. We're just trying to put it together and make sure we understand what some of the standards are in the industry around how you would actually measure that. I think a lot of people look to the carbon footprint to begin with and they look to energy saving devices in their products, but how do you measure that? Do you measure that in standard kilowatt hours? Do you measure it in percentage of reductions year over year? We're just taking a look at that, to be honest with you. The other folks that we also tie into are some of the consulting companies like AMR Research, Aberdeen and Gartner to find out when are standards going to be developed in the different industries, including telecommunications.

We went through a supplier rationalization process about three or four years ago where we reduced our supply chain footprint from like 450 suppliers down to about 172. We have just under 2,000 finished-good products, 12,000 parts, and about 6,000 to 8,000 active in any one quarter. We take our total footprint of suppliers and we rank them as far as what we call preferred or A-class suppliers. This is older data, but two years ago about 85 suppliers accounted for 92 percent of our total commodity purchases. And those we collaborate with using supplier collaboration software, so we work very closely with those suppliers and we're in the midst of having them fill out a survey that we just developed at the end of last year and the beginning of this year as to what their sustainable efforts are, what they're doing in the green environment and what key initiatives they have on

“As we move through time, people are going to be more and more conscious of CSR and green efforts and more and more requirements are going to be put on different companies.”

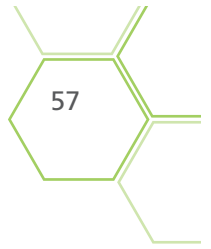
tap. We received about 90 percent response from it; but as I mentioned earlier, these are A-class suppliers so most of them have, if not a program in place, the beginnings of a program. Our two outsourcing companies that we use, Celestica and Jabil, have a well-defined CSR footprint and initiatives going on in their manufacturing plants from air quality control to water reduction to energy consumption reduction. So they're probably a little bit further ahead than we are. We've even had representatives from Celestica and Jabil in our plant at our quarterly reviews to share best practices. We had Arrow in three years ago before we really started to get into the CSR philosophy to give us an update on what they were doing around sustainability. And if you remember back three years ago, it was really all about RoHS and WEE initiatives, which were the very, very beginnings of CSR.

We had a little bit of a wake up call about a year ago. We had an RFQ Request for Quotation bid on a contract with British Telecom, and they're very much further ahead than most of the domestic carriers in the United States. They had a series of questions that they asked us, which made us much more aware of the different facets of CSR, and it also showed us how much more advanced the European arena is in CSR than the United States, in terms of process, governance and awareness.

As we move through time, people are going to be more and more conscious of CSR and green efforts and more and more requirements are going to be put on different companies. From a carbon footprint perspective you have to measure how many carbon emissions you have; from an energy perspective how much electricity it's costing you to run products; and from a landfill perspective how recyclable are your products because there will be a tax on that eventually, whether it's government imposed or if it's in the form of you have to recycle your equipment even if you've sold it to someone else. The better your suppliers are in terms of these things, the better you can offer a product that has those attributes that would be better than the competition. In the telecommunications arena, for example, there was one company that came out six months ago and said if you compared their routers to a competitor's routers in the same environment of a large corporation, you would have saved \$250,000 in three years. Now, that gets peoples attention, even in the trillion dollar world that the government talks about today.

I think it's becoming more and more of a competitive weapon to be able to state the energy gains that you've been making within your value chain, not just what you're doing yourself, but who you buy from and how you transform whatever raw material it is into a finished product and how you can reclaim that, recycle it or make it easier to use. So from one perspective I think getting more visibility would help us out that way. And as we head towards a more controlled environment, a la California passing new regulations or states trying to come up with a new tax, it behooves us as a leader in the telecommunications industry to be able to have a standard format so that we can go to the telecommunication bodies in government and explain to them how we are becoming more eco-friendly and are in front of the curve because we're the experts, they're not. And the last thing we would want would be rules and regulations imposed by non-experts.

One of the folks on our cross functional 'green team' is an engineer who is involved in new product introduction, and he is incorporating CSR into the product life cycle process. First, we're trying to rate all of our equipment based on an energy rating so that we can establish a benchmark and then reduce it year over year, product over product. The other thing that we're doing is trying to incorporate DFG, or "design for green," into our new



product introduction arena. So instead of DFM, “design for manufacturing,” or DFX, we really want to get DFG going, which would mean everything from reducing the amount of packaging on our products to changing the way we transport our products. In terms of packaging, we recently took actions to reduce our packaging footprint, decreasing the amount of air that’s in a box for shipping density and we’re looking for different solutions for fillers that are more eco-friendly and reusable. We’re trying to get “DFG” integrated into our new product introduction (NPI) process, so that it starts at ideation and conceptualization and continues all the way through the product lifecycle and even recycling at end of life – easy to say, very difficult to do.

Faculty Board Perspectives

Jim Hourigan

VP Supply Chain/Former Consultant
BuildDirect



“Right now unless you’re way out in front & a huge company like Wal-Mart, it’s becoming a qualifier. Everybody’s got a green initiative out there or a green logo on their website. So if you’re not involved in the green discussion, you can’t compete.”

As a consultant, I am currently working with two different companies in the medical devices and equipment industry on their supply chains. What I’m trying to bring to them is not only more visibility and transparency in their manufacturing sites all over the world, but drill down even further to who are the suppliers to those manufacturing sites. I have seen companies improve the speed of their supply chain and make it more demand-oriented rather than sort of a pull type situation. I don’t believe that you can just stop at the manufacturing site. You actually have to drill all the way back to the raw material suppliers. There’s sort of a win-win by doing this. One, you can certainly establish how green your supply chain is, but secondly, you can look at what flexibility you might have in your supply chain that you hadn’t realized. At what point can you actually hold inventory at different stages until you can actually get a better read on demand? In other words, being able to postpone as long as you can until you see an actual order, in my experience, is very beneficial to companies.

I think it’s still early days in regards to this topic. There are a lot of people that want to do the right thing, but haven’t figured out how best to do that yet. One of the things that I’ve looked at that I think makes a lot of sense is what I would call “right sourcing.” When you look at bringing products in from places like China and Indonesia, you should calculate your total ecological footprint versus would it be better to have a plant in Mexico or Central America, and what are the trade offs there? I think what’s been done is a lot of companies have outsourced and gone to low cost country supply, but perhaps that was only based on one part of the price equation and the company hasn’t really thought through flexibility, risk and time to market. All of those things need to be put into place – not just the lowest cost.

One of the companies that I deal with is Wal-Mart who is doing a lot of the right things. They’re a very demanding customer, but they’re also one that wants to help companies that want to work with them do the right thing. Wal-Mart has recognized two important things. One, it’s certainly the right thing to do from an economic perspective and the investment will pay off for them, which is their prime concern, but secondly, from a PR view I think they could really get some mileage out of this and sort of negate some of the negative PR they’ve had over the years. Right now unless you’re way out in front and a huge company like Wal-Mart, it’s becoming a qualifier. If you’re not green you’re not going to be in the game. I’m not seeing the same PR benefits for smaller companies. Everybody’s got a green initiative out there or a green logo on their website. So if you’re not involved in the green discussion, you can’t compete.

I think the biggest challenge for companies is achieving this visibility within their supply chains, and the second would be collecting the right amount of data and information and then having the time to analyze it. We work with our clients to take some of that raw data

and put it into an understandable format that people can make informed decisions with. There's a lack of transparency on the process from raw material supplier to the manufacturer and then the manufacturer to the available for sale inventory. A lot of companies use 3PLs to get their product available for sale and they add some visibility, but probably not enough.

Although industry is still trying to get their heads around the things we need to measure, carbon footprint, fuel and packaging are three key factors. I think the next one everyone is still trying to figure out is sustainability. One of the companies I work with manufactures latex surgical gloves, so working with sustainable materials is a big issue for them. The other company I'm working with does flooring, so the big pushes for them right now is for more use of bamboo and cork.

The first thing that companies need to do is actually map the supply chain and that's all the way from the raw materials through to the customer or end user. That's getting the butcher paper out and putting it up and understanding exactly where things come from and go. In addition, those companies need to show that map to everyone in the organization. I find that wherever I go there's a lot of pent up ideas, suggestions and expertise that are not tapped into. If you put that butcher paper up and leave it there and let people scribble on it – I find that it works very well.

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Nari Viswanathan

VP/Principal Analyst, Supply Chain Management
Aberdeen Group

AberdeenGroup

“...In the current economy, companies are being forced to look at efficiency & business processes first, and sustainability second. That said, more and more companies are realizing that if they get back to basics and focus on the right things, an efficient & cost-effective supply chain has a direct effect on reducing carbon emissions & waste.”

My role is to manage Aberdeen Group’s Supply Chain Management Practice from a research planning and delivery perspective. Sustainability is one of the key drivers for companies to assess the efficiency of their supply chains. In my current role, I look at sustainability from a supply chain point of view, and identify areas in my clients’ supply chains where various strategies and tactics can be implemented to make them more sustainable.

From my point of view, a good definition of green supply chain principles involves how companies can minimize their costs, improve profit margins and also ensure sustainability related goals are met. Admittedly about 9-12 months back sustainability was more top of mind for companies. In many large companies, eco-consciousness was a primary goal. But today, in the current phase of the economy, companies are being forced to look at efficiency and business processes first, and sustainability second. That said, more and more companies are realizing that if they get back to basics and focus on the right things, an efficient and cost-effective supply chain has a direct effect on reducing carbon emissions and waste.

In terms of which industries and companies are at the forefront of this issue, I think companies in the high-tech space, as well as manufacturers of telecommunications and networking equipment, are leaders because they have to be. Historically, they’ve had a bad reputation in the marketplace because of products having harmful chemicals and difficult recycling processes. But these companies are beginning to be very conscious of it now because if they aren’t, it will begin to affect their brand. The high tech sector is ahead of the curve in terms of maturity, because technology companies were the first to outsource to developing countries, and therefore, have seen the problems involved ahead of other industries. Also, by definition high-tech products, like a computer or an iPod, are not easily biodegradable. As a result, there are more and more technology products ending up in landfills everyday, and the industry has had to deal with this. Packaging is another area where consumer technology companies have had to make changes, but it is also one of the areas they are doing the best job in. There is also the problem of harmful chemicals produced in the manufacturing process. The high technology industry has recently been focusing on not only how to reduce their carbon footprint in the manufacturing process, but also in the products themselves by making them more energy efficient.

I have recently been working closely with the VP of Supply Chain at a large high-technology company on the environmental impact and sustainability of their supply chain. They have many areas they need to look at: the energy efficiency of their data centers and the cost involved in running them, as well as their products themselves. For example, how can a router be more energy efficient? Can it have a standby mode rather than running all the time? Then there are the hundreds of suppliers in the organization’s value chain – how do they ensure they are running an ethical and sustainable organization?

The consumer packaged goods sector is also focusing on sustainability. CPG companies have been making a lot of progress recently by creating internal departments focused on

sustainability, appointing chief sustainability officers, and other executives with CSR titles. It is not enough for any company to implement sustainable practices only in their supply chain, but they must make it part of their corporate culture and make it a priority in every part of their business.

When we ask companies about the top reasons why they are looking at “green” from a corporate standpoint, the majority of them attribute it to their brand. Branding and marketing from a CSR perspective is a key reason why companies are “going green” and adopting sustainable practices. From a consumer demographics standpoint, generation Y is much more likely to be focusing on green products and only buy products that are marketed as “green.” I think the sales and marketing benefit is applicable to any industry. In retail, the Gap for example, has an advantage over other apparel companies because of the high brand awareness by generation Y. More and more, consumers are demanding these kinds of sustainable transformations from the products they buy and the companies that make them.

In a recent benchmark report we published entitled “Sustainability Matters, The Corporate Executives Strategic Agenda,” Aberdeen outlined three top pressures driving the sustainability agenda in corporations. According to this research, they are: one, the desire for environmental/social stewardship and corporate responsibility; two, the desire to increase/maintain brand perception and value; and three, internal/external stakeholder pressure and expectation. Rising energy costs, and present or expected regulatory compliance mandates came in fourth and fifth. From a supply chain perspective, however, I believe it is more about cost efficiency, as well as the opportunity to gain additional revenue. It is a multifaceted and complex problem, but in most areas a company’s carbon footprint is directly tied to costs. Transportation is a good example. The less miles traveled, the less fuel consumed and the less carbon emitted.

One of the primary challenges we face in working with companies on sustainability issues is getting corporations to make it a top of mind priority. It is sometimes difficult for cost-conscious companies to understand why sustainability can have business benefits. But when there is alignment between business challenges and sustainability pressure – things can improve.

A good example that comes to mind is a metals company based out of California that spoke at the Aberdeen SCM Summit 2009. They had significant problems with their logistics network, particularly developing an efficient transportation schedule. Rather than retooling the company’s entire truck fleet to meet new regulations, they converted their transportation completely to rail to reduce costs. Although minimizing costs was the initial and primary driver of our involvement with them, reducing carbon emissions was a byproduct and a resulting benefit of our efforts. This is a perfect illustration of how a single company was able to align its urgent business goals with its long term sustainability goals, even though sustainability wasn’t even one of the initial drivers. It is when the two connect and align, that sustainability initiatives are successful.

In terms of what companies should be focusing on right now in order to achieve greater visibility and sustainability across their extended value chains, the first thing companies need to do is truly understand their extended supply and demand network. Who are their suppliers and partners? Then companies need to conduct a “root cause” analysis. What are their key sustainability challenges, from every angle and perspective: the product side,

the buy side, the sell side? What's the demographic of the consumer? Is the customer demanding these changes?

There are often other issues involved that complicate the process. Each company has unique challenges and issues like ethics when it comes to looking at their multinational supply chain and assessing their sustainability needs. The greatest challenge for high tech companies might be the power efficiency of their products. Metals companies like the one I mentioned earlier might find that transportation and carbon emissions are the biggest challenge. Each company and industry has unique issues that must be identified and then benchmarked. Once those issues are mapped out, the company must pinpoint the top five or six issues so they have somewhere to start. Lastly, and most importantly, the company must launch an initiative, or several, to address the issues they've pinpointed. Pilot initiatives are a great way to start. There are organizations in every industry out there setting the standard.

Unfortunately, the reality is that there is no single, standardized way of capturing and measuring carbon emissions. Some metrics try to quantify the social cost of carbon; others convert 1 metric ton of CO₂ into an economic value. Companies need to start making business decisions based on a number of factors, and including carbon costs in the equation. The problem is, carbon costs are costs that they don't see. How do companies measure the efficiency of their supply chains? Once they have figured that out, how do they incorporate carbon into the cost? If companies can figure out how to quantify how much carbon they are emitting, they can try to reduce both carbon and monetary costs simultaneously. Another approach is to normalize the process, by measuring the amount of carbon they are emitting and then converting that into a monetary value. But I haven't seen too many companies doing that yet because there is no standard system to do so. Currently, in the United States, there is no financial incentive for companies to reduce their carbon emissions. In Europe, however, there is something called the "social cost of carbon," which we actually published a paper on last year.

For the United States to be successful in corporate initiatives to reduce carbon emissions, it needs to be mandated, and there needs to be standard metrics developed to help corporations measure their carbon footprint. Traditional logistics metrics, like number of miles traveled and amount of packaging used, are already being used and do reflect a company's carbon footprint to some degree. However, actually standardizing the metrics and measuring carbon emissions is the challenge we currently face.

"For the United States to be successful in corporate initiatives to reduce carbon emissions, it needs to be mandated, & there needs to be standard metrics developed to help corporations measure their carbon footprint."

Pankaj Bhatia

Director

Greenhouse Gas Protocol & World Resources Institute



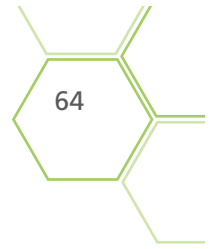
“For multi-national companies that operate globally and have supply chains spread across the world, they have to identify the different risks and opportunities that cross the value chain. That becomes a very important decision tool for them as they try to optimize their supply chain and investment strategies.”

The Greenhouse Gas (GHG) Protocol Initiative was started in 1998 by the World Resources Institute (WRI) and the World Business Council for Sustainable Development (WBCSD), and at that time the main driver was that there were some companies conducting Greenhouse Gas inventories, but there was no common and consistent approach to quantify GHGs. We started this initiative to develop global standards on measuring and reporting all GHG impacts at the company level. The primary goal was that once you have good measurement approaches in place then that will stimulate and support a company's efforts to implement GHG management reduction activities. Our basic formalized measurement framework is a foundation for effective management. Initially our focus was on a company's own control operations and manufacturing activities, but we have since expanded our scope of measurement approaches to look into full life cycle accounting.

When a company wants to pursue supply chain management, one of the things that they have to do is collect data from their suppliers. There are so many different initiatives on supply chain out there and whatever data companies collect and then report, they have to be able to substantiate and use an internationally accepted methodology. The GHG Protocol, being a very established standard and brand in the marketplace on accounting and reporting of emissions, provides a basis for companies to go to their suppliers and ask them to report on their Scope 1 and Scope 2 GHG emissions to facilitate the quantification of their Scope 3 emissions and implementation of their supply chain management programs. The GHG Protocol methodologies are generally well accepted and in many cases suppliers may already be implementing them for their own operations internally.

With the most recent demand for supply chain standards, big retailers like Wal-Mart are pushing for Greenhouse Gas disclosure from their suppliers. Companies undertaking supply chain management seek to position and differentiate themselves in this competitive scenario. With so much attention on climate change today, many countries have started to put in place regulations – at the moment this is mostly in developed countries, but eventually regulations will be implemented in developing countries as well. For multi-national companies that operate globally and have supply chains spread across the world, they have to identify the different risks and opportunities that cross the value chain. That becomes a very important decision tool for them as they try to optimize their supply chain and investment strategies. Cost savings are a primary benefit, but undertaking global measurement and management of the supply chain has multiple benefits. Also in the marketplace, customers are becoming more aware and there is going to be a category of customers who would like to find such brands that distinguish themselves as climate friendly or carbon neutral.

Even after standard metrics are put into place a major challenge that companies must overcome is a lack of capacity among their suppliers, especially in developing countries like China, India and Brazil. Even if we have good standards in place there is a difficulty in data availability there. Suppliers may still lack the technical capacity to implement the standards. There is also the issue that technology is not currently being used to its



full potential when companies are undertaking supply chain management, especially Greenhouse Gas management. Technology can provide very effective approaches to collecting data in an efficient way, quantifying data, undertaking quality control checks, and more.

The first thing companies need to do to get started is to educate themselves on the standards out there. The GHG Protocol Corporate Accounting and Reporting Standard already provides a supply chain framework by outlining the three scopes; scope one, scope two, scope three. I would advise companies to study this document and give it to their suppliers; and if their first tier suppliers could supply them scope one and scope two data, then that would be a very good first step. In doing this, they can expand their supply chain management in Greenhouse Gas emissions. The next step would be for each supplier to go back to their first tier suppliers and ask them to provide them with scope one and scope two data, and so on. This way you are able to build your full supply chain database. The higher ordered tiers are going to be more difficult, so we will be looking at a combination of approaches for those scenarios. Higher order tiers are not able to provide data and supplementing such data gaps with input/output data models. Unfortunately in countries like China and India where many of these suppliers are based, they don't have locally applicable input/output databases.

Besides Greenhouse Gas emissions and carbon footprint, I think water footprint is also emerging as one very important issue. The way I see it, once we have developed and tested these methods for Greenhouse Gas emissions, we can expand the application of these methodologies for other environmental impacts.

Stephen Stokes

VP, Sustainability and Green Technology AMR
Research



“It’s clear from every survey that’s taking place at the moment that all aspects of stakeholders beyond the organization – be their supply chain partners, their customers or government – want to interact and work with companies and organizations that are making specific efforts, measures and strides to try and demonstrate environmental performance within their products and operations. So the marketplace is demanding it.”

I am the vice president for sustainability and green technology at AMR Research. We, as a firm, have been around for 30 years and offer advice and independent research and analysis for a variety of large business organizations. We started out when information technology first converged with business, as efficiency and enterprise technology was a major part of our first work. The second phase of work came along about 20 years ago when we recognized – before my time – that there was a need to embrace other forms of business process excellence. And the most obvious form of business process excellence, in an ever increasingly globalized world, was to make sure that supply chains were efficient. So AMR was involved in the creation of the supply chain council, the school model of supply analysis and we are leading experts in supply chain technology, supply chain best practices and supply chain performance.

About three or four years ago, both in conversation with our clients, as well as internal thought leaders, we realized that the sustainability, the green and the environmental change agenda were going to be potentially one of the next great legs of the stool of business excellence. The first leg being information technology and how that delivers efficiency; the second leg, really, inventing the science of supply chain management; and the third leg recognizing that those supply chains need to ever increasingly align their efficiency and performance with environmental and economic goals. That’s essentially where we’ve come to at this point. So I lead a relatively small, but very rapidly growing practice within AMR, and we offer three types of services or advisories. The first is a forum environment in which our user community comes together and discusses best practices, shares ideas and interacts on a fairly informal basis. In addition to that, we drive a research agenda which is focused around things like frameworks for sustainability, benchmarks for sustainability, gap analysis, best practices, carbon in the environment, energy management, energy efficiency and trying to develop metrics to define and quantify all of those things.

Visibility and sustainability throughout the extended value chain is already very important and it will continue to become increasingly important over time. It’s important from the point of view of the marketplace, the longevity of an organization, business efficiency and ethics. It’s clear from every survey that’s taking place at the moment that all aspects of stakeholders beyond the organization – be their supply chain partners, their customers, government – all have this green agenda, this environmental and in particular emission and water usage minimization and focus. They want to interact and work with companies and organizations that are making specific efforts, measures and strides to try and demonstrate environmental performance within their products and operations. So the marketplace is demanding it. That’s factor number one.

Factor number two is that from the point of view of almost all measures associated with the environment, if you take apart the various potential problems and the potential actions that organizations can take, they make simple good business sense by reducing the costs of doing business. This applies to reducing carbon emissions, water usage and energy usage. Sometimes those cost reductions can be of the order of 30, 40, I’ve seen even

quotes up to 45 percent reductions of total energy, for example, in things like both mobile and fixed assets and production lines that can be achieved. So any organization that doesn't recognize that makes simply good business sense shouldn't really be in business.

And the third factor is from an ethical angle. Simply put, as days go on, we accumulate more and more knowledge about ourselves, our planet and the potential impact that we have on our planet. We've had previous encounters with things like the Montreal Protocols to remove CFCs, things like the acid rain legislation that took place in the '80s. They have demonstrated that by improving performance one not only benefits the environment, but also benefits the organization. So ethically we understand now that the full cost of doing business should also incorporate the cost of the impact on the environment, and as long as we continue to more clearly quantify and measure that, the more obvious it will become. So it's from almost every level that an organization looks, either directly at the balance sheet or by looking at the marketplace, at the mission, the values and the very philosophies that the business is operating. It makes obvious good sense for a company to move more towards an environmental appropriate position.

Why are companies starting to think about the environment? First of all, you have to think about the difference between energy intensive supply chains versus non-energy intensive supply chains. Now, you take the case of something like the technology sector. They are relatively energy non-intensive, but they are customer facing. The marketplace wants them to be clean, and they have realized that they can drive significant savings by being green so they are very aggressively pursuing this as a position of competitive advantage. If you look on the TV today, they are no less than three separate organizations that claim to be the greenest technology company in the world. They'll remain nameless, but certainly the sorts of performance of all the leading organizations like Dell and Hewlett Packard are really defining the way. There are another bunch of technology companies, like Motorola, Intel and Philips Electronics, who have been working hard at an environmentally and operationally efficient supply chain for, literally, 15 years and have not made a big fuss and a lot of noise about it. So they're, perhaps, underappreciated in terms of the sort of efforts they put in.

Now when one moves to other types of verticals which are energy intensive, they are more worried about the actual cost of doing business in relation to energy and emissions – many utilities, many heavy industrial organizations. Cement, for example, is a fantastic example of an industry which desperately needs to have leaders and great stories to tell. Cement manufactures represent something like 8 percent of global CO2 emissions. Significant amounts of that could be reduced by innovating and developing new technologies for the kiln firing of the raw material limestone and the use of additives and alternatives. The cement vertical, in particular, is one that is directly linked to China with something like 50 percent of all the cement in the world that's being cured today taking place in China. But it's an area where we need to be much more innovative.

In terms of the chemical industry, they're unusual because they sit right in the middle between being somewhat customer facing, somewhat energy intensive and somewhat mindful of trying to drive operational performance. There are a couple of companies that stand out in my mind in that regard. You can't look past DuPont who has a fantastic reputation in sustainability and have even spun out business services around advising about sustainability. But I think the true leader in the chemicals industry is Dow Chemicals. They have made substantial strides to drive down energy costs and emissions within their

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organization. They have tried hard to use alternatives to fossil fuel-based hydrocarbon inputs to a lot of their chemical supply lines. They’ve also tried hard to track and account for their carbon footprint. Out to 2015 they’ve set a series of goals to try and achieve reductions on a whole cross-section of sustainability initiatives. In addition to that, they have been very determined about using the sustainability movement and agenda to drive innovation: innovation inside their products, processes and inside themselves as an organization. GE is another example of an organization that has tried hard to see the upside and the opportunities that the climate change or the sustainability or the low carbon agenda presents. They’re making allegedly something like \$18 billion a year out of their eco-imagination, carbon-conscious product, and they’re hoping that that will grow by about 40 percent over the next five to six years.

There is, believe it or not, still some resistance within some organizations. Everyone understands at the highest elevation, the highest altitude it makes sense, but a lot of people find confusion to getting onboard and actually making a transformation because transformations usually involve pain, confusion and investment, especially at this point in time. Certainly in the North American landscape, return is expected from investments over reasonable time periods. And the stock market and shareholders look at companies and how they perform over the timescales of quarters of a year, not the many numbers of years which some of these significant investments require. Another major area which is a big problem is uncertainty. The fact that there’s been widespread uncertainty about whether or not things like carbon taxes will arrive, whether or not markets and consumers will actually pay more or care more about green products have been a bit of a resisting factor. As uncertainty has gone away with things like Mr. Obama’s legislation, with more and more customers pointing at green products and the growth of the share of green products in the overall market, as uncertainty goes away and clarity appears, it’s easier to move forward on that.

Another reason why it’s very difficult to get traction around sustainability, is that while for the most part people recognize the importance of sustainability, it’s not yet been efficiently and effectively translated into business language; something that we talk about in terms of fact-based sustainability. We think that there is a lack of real frameworks about how organizations can incorporate sustainability and a lack of real metrics around the way that sustainability can be precisely and accurately quantified within an organization and if you can’t quantify it, you can’t monetize it. Organizations are ultimately about making money, so monetization is an important factor. And the other thing which we are also trying hard to build substantial models around is the extent to which we can benchmark an organization’s performance. If you want to compete on the basis of environmental performance, you have to be able to say as an organization we are scoring at the top of some ranking system; and that ranking system must be robust, it must be quantified and it must be able to be applied in wide range of areas. Those things really have been lacking from the sustainability landscape which have limited it becoming part of normal native business practices.

I think the first things that companies need to do to get started are pretty obvious, but sometimes overlooked. I think they first of all have to look around their industry sector and try to come up with the two or three organizations they think truly are leading examples of good, sustainable practices. They need to understand what the best in class performance in terms of sustainability actually is for their given type of activity. Once

“It’s got to become part of the DNA of the organization, not in terms of having specific sustainability officers, but making sure everyone has their head around the idea and has it part of their regular job and function.”

they’ve done that, they need to then ask themselves where they are at the moment. Quantify their existing environmental performance, be it in terms of energy usage or emissions or waste or preferably all of those factors in a multivariate way.

By measuring both where they are and where they think they would like to be if they want to become leaders in that space, they’ve essentially undertaken a gap analysis. And once you’ve got a gap analysis in place, you can then decide over what timescale you’d like to try and migrate from where you are to where you think you would like to be. And once you’ve set for yourself a series of targets and goals, you can then set yourself about deciding which of those things are easily achievable, either in terms of time, effort or expense. You should then leverage early benefits to secure subsequent ones. It’s very important to make sure that is done in a truly transparent communication environment, both within the organization and beyond the organization. And I think that’s often overlooked. It’s great to make sure that an organization’s willing to stick its hand up and recognize where it fell short previously in the environment and where it needs to improve its performance. Because this is such a relatively young aspect of business practices, it’s a fertile area for sharing ideas and information, much unlike many other aspects of business performance.

In terms of metrics, we’ve got to ask ourselves what does a solution look like and who should own it? And our research suggests that the solution should be a combination of a reasonable and robust information technology platform to capture data, but it also involves having domain specialists, people with specific skills either internal or external to the organization who can actually understand, interpret and advise around that information as well. So you need a mix of software and services to deliver this as a solution. Whether those software and services should be internal or external to the organizations is a very important point. The people we speak to who tend to lean on consultants externally to do a lot of this information gathering and advice don’t tend to evolve as authentic or leading sustainable organizations. It’s got to become part of the DNA of the organization, not in terms of having specific sustainability officers, but making sure everyone has their head around the idea and has it part of their regular job and function.

A good example of this occurred in the Subaru factor in Indiana, with their zero waste initiative. They haven’t had a rubbish truck go against the backdoor of their factory for something like five years now. When I asked them how they managed to train people to start to recycle, to avoid and minimize waste, they said they didn’t need to retrain their employees. Rather, it is a part of the basic training program that all employees take on now, so it is part of the company’s DNA. The second part of the question is: what should be measured? In simple terms, what should be measured is absolutely everything, and that’s, again, where one needs a robust and a sound information technology platform to capture that information because that’s where every industry has different sweet spots, different levels of water usage, different levels of labor issues, different levels of toxicity issues. But all that information has to be captured because it’s not until you capture that information you can begin to do the sort of gap analysis I mentioned earlier to make sure you migrate your practices on a continuous basis towards best in class performance, and actually not just be ahead of the curve but try and actually shape and define that curve for the future moving forward.

Jeff Rodgers

Analyst/Supply Chain Project Manager World
Resources Institute



“While many companies are going green within their own operations, there’s an added level of complexity when trying to improve the environmental performance of a supply chain.”

The World Resources Institute is an environmental think tank that works at the intersection of business and the environment. WRI proactively engages with businesses to develop practical solutions that help overcome the hurdles in becoming more sustainable organizations. The Green Supply Chain project developed out of an influence strategy based on reducing corporate environmental impacts for products and services – of which most come from supply chains and not internal operations. While many companies are going green within their own operations, there’s an added level of complexity when trying to improve the environmental performance of a supply chain. So the project developed out of that need, and began with a small group of influential companies that are more progressive with their supply chain strategies.

The project serves two purposes: to guide WRI’s research to make it as effective and useful as possible and to create a forum where companies come together to exchange best practices and work collaboratively with one another. The three main pillars of the Green Supply Chain project are: one, to address the problems associated with the different standards and protocols out there, and clarify the confusion in the marketplace; two, to help build supplier capacity, especially in developing markets; and three, to build a financial case for environmental responsibility in the supply chain. In order to do that, we conduct research to take back to corporate executives to promote green supply chain strategies.

Companies are responsible to their shareholders, and if shareholders are demanding corporate social and environmental responsibility, then it’s the right direction for a company to head. Executives from many companies are now recognizing the added business value of pro-environmental strategies. Greening the supply chain is the next step towards total quality management and, therefore, what companies are doing is becoming more efficient with resources, valuing those resources more effectively, and securing valuable resources to reduce the risk associated with the procurement of products in supply chain.

The electronics industry is one of the industries at the forefront of implementing environmental responsibility within their supply chains. Specifically, the development of the electronics industry code of conduct has brought together original equipment manufacturers along with the consumer facing brands to develop specific standards for not only social issues within the supply chain, but for environmental issues. The EICC has made significant progress in developing an acceptable standard across the board for the industry. The electronics industry has done remarkable things as a cohesive group and as a result has created a greater impact through not having overlapping initiatives that compete with one another.

Outside of the cost benefits, I think the biggest benefit of a greener supply chain is the reduction in risk associated with procurement. The majority of the corporations that we are working with have recognized the environmental risks associated with their own internal operations and where they’re susceptible to climate change, water scarcity, regulatory impacts, and other environmental factors. However, they are just scratching the surface when it comes to supply chain risks, and it doesn’t matter how well they prepare

their own operations, if they haven't addressed it within their supply chain, they risk the disruption to the products and services they offer. In the manufacturing industry, for example, companies are being proactive about dealing with water scarcity, because it has become one of the largest issues facing them at the moment.

In general, one of the biggest obstacles companies are facing is the proliferation of standards, protocols and certifications. I think it becomes increasingly difficult for companies to understand what standards mean what, and how they compare with one another. The inability to compare standards and the development of "black box standards" creates resistance by suppliers due to different and over burdensome reporting measures and you still don't know whether you're getting a product that's actually addressed the risk to its own production or whether it's just essentially a "green-washing" scandal. Beyond certifications and standards lies the challenge of being able to get the metrics and quantitative measurements that companies need to really analyze the data within their supply chain and determine what risks exist.

Some of the greatest progress made thus far has centered around greenhouse gas emissions. The Green House Gas Protocol has developed a consistent accounting tool for GHG's and as a result it's become easier to compare organizations and their GHG performance. Hopefully with the new administration in place and a greater understanding today that a cap and trade system may be coming soon we will see even faster progress in this area. There are real implications for financial organizations with a price on carbon, and so a lot of companies have come very far in measuring their greenhouse gas emissions. Another area that companies are really starting to get into is water, and food and beverage companies are leading the charge here. These are companies that recognize the issue within their own supply chain because of their agriculture roots and the fact that they're incredibly susceptible to climate change issues. Being able to measure and monitor within your supply chain and realize what the available renewal water supply is for an area and how much is being used in relation to the renewable supply is of growing importance and a lot more action is happening in this space.

In addition, the electronics industry is getting more and more on top of hazardous materials, and we're seeing a great deal of end-of-life product take-backs beginning to take place. New take-back programs are being established with many different companies, and we are seeing innovative new business models including private and nonprofit players. Take-back and recycling products are very exciting and there's tremendous opportunities for financial gains to be made as these business models improve and become more efficient over time.

Andrew Winston

Corporate Environmental Strategist & Co-Author
Green to Gold



“The example I always use, the quintessential one to me is Wal-Mart. Their supply chain push over the last few years has been profound. I think it’s changing the way business is done worldwide.”

I come from a business background – marketing and strategy roles. I made a career change about eight or nine years ago and decided to pursue a passion and see how I could combine business and environmental issues. I went back to school to get a degree in environmental management and started working there with a professor, and we co-authored Green to Gold. I spent two years on the road talking to companies about their environmental practices, why they were going green, what was working and what was not working. The focus was on both broad strategy and tactical operational stuff, from supply chain to marketing and positioning. We laid out in the book what we saw companies doing and what we thought were the frameworks that companies should use to think about how to green their operations and strategies.

One of the underlying, overarching themes of the whole book is the value chain. Thinking about the value chain is a critical part of the green business mindset that’s at the core of the book; and that value chain thinking is both upstream in your supply chain and downstream to your customers and beyond to the product’s end of life.

Today, I have a small consulting practice, but I mostly do a lot of evangelizing, speaking and writing. When I give my talks, and when I’m conveying this to people, I talk about the forces that I think are still driving this green wave, even now during this downturn, and perhaps even more. And one of the main forces is the greening of the supply chain and the pressures that business places on itself.

The example I always use, the quintessential one to me is Wal-Mart. Their supply chain push over the last few years has been profound. I think it’s changing the way business is done worldwide. I think they’re the most complete example right now. Wal-Mart is really changing the world, and there’s been a few things they’ve done over the last few years that have been in the media quite a bit, but the three that I highlight in my talks over and over again are: one, they started asking for carbon footprint information from a series of suppliers; two, they set standards on products like the amount of lead in toys – and those standards are much more strict than that federal government’s; and three, they went to China to a meeting I was at in Beijing in the fall, and they pulled together 900 manufacturers in China, which is a big percentage of the manufacturing base, and they told them they needed to reach higher environmental and social standards, within a few years, because they would be audited more, etc. And the CEO said, “If you do not meet these standards, you will be banned from selling products at Wal-Mart.” That was probably the most clear, historic statement I’ve heard in the sustainability movement. It was one of those meetings that few people knew about. And they’re doing these meetings repeatedly.

I just spoke at another one of their sustainability summits in June, this one in Brazil for their South American suppliers and operational people. It was basically the same conversation as in Beijing. So they’re very, very serious about it. They don’t know exactly how they’re going to meet these goals. That’s the big concern, obviously, but the pressure they’re applying is changing industries all around the world. You hear company after company say, “Yeah, we were doing this green thing, but now we really have to. Wal-Mart’s asking. And we have to change our products.”

“There are benefits to greening the supply chain in every bucket of value. In Green to Gold we outline four main buckets of value as a framework: reducing costs, reducing risk, driving revenues and building brand value.”

A lot of different consultants in this space have been circling around Wal-Mart. They've been working with Blu Skye, with Conservation International for three, four, five years, and a couple of those groups have said to them, “your real role is not greening your stores, which is great, or greening your fleet, or all these other things,” which by the way, Wal-Mart is doing and finding incredible savings in. They said, “Your real impact is going to be in your supply chain.” And that was the big new thinking for them. And that's, I think, just caused these enormous ripples all around the world.

Another company that I spent a lot of time with in my research for Green to Gold, and the one that we use in the book as the example for supply chain is IKEA. In my opinion IKEA has one of the most complete environmental programs in the world. They think about the full value chain. They've worked the most extensively on their supply chain for years. What really distinguishes them, though, is that they go very far back in the supply chain. They audit forests. They have 18 to 20 full-time foresters on staff, which is more than some countries. And what's compelling about that is that they don't actually buy wood. They buy furniture. So they have people employed, basically, to check the sustainability and the harvesting practices of something that's two steps up their supply chain. I think that's really impressive. And they spend a lot of money doing all these kind of audits. They have approximately 80 auditors of their supply chain. They have very detailed audits of a whole range of environmental issues. And they spend a lot of money on it, but they don't – for a company that pinches pennies – seem to care. They consider it just another cost of doing business.

In terms of the difference between Europe and the United States on this issue, one of the things that I noticed in doing my research, and I talked about it with some companies in the U.S. – and this is an overgeneralization and difficult to actually back up so we didn't write about it in the book – but some of the longest-standing green companies in the U.S. come from German and Northern European stock. And I asked some of those companies, like 3M and Herman Miller, “Do you think it's partly because of the Northern European sensibility?”, and they said, “Yes.” It's not surprising. There's just a sense of the common good that's a little bit more deeply engrained. And it's actually, interestingly, in the U.S., a fairly apolitical issue. Herman Miller sits in one of the most conservative counties in the country, and it's one of the most socially responsible companies around. So I think it's great when you see that it can be very apolitical. It should be apolitical.

I truly believe that what's happening very quietly is that the companies with the best sustainability story and the lowest packaging, lowest energy use, are going to get more shelf space. And I think it's already happening now. It's just not being talked about.

There are benefits to greening the supply chain in every bucket of value. In Green to Gold we outline four main buckets of value as a framework: reducing costs, reducing risk, driving revenues and building brand value. Clearly, the biggest one is risk reduction. I think that's the obvious one. When Mattel and others found out that there was lead somewhere in their supply chain for their toys a couple months before Christmas – that obviously wasn't good. That kind of problem creates tremendous brand risk and actual loss of sales. The other clear value bucket is the opportunity to cut costs up and down the chain. That's certainly what Wal-Mart is demanding – they believe that pushing suppliers on green practices will save money, and then they, of course, want suppliers to pass those cost savings on. This is Wal-Mart after all.

“There’s real value in knowing your business better, knowing where your impacts are, knowing that if carbon gets priced, which it will, what that will do to your distribution chain for a lot of different products.”

Another thing I talk about in my speaking engagements is that there are more and more companies selling that supply chain story; that they got certified lumber at Home Depot and certified fish at Whole Foods and fair trade coffee and all those things. Companies need to be able to tell that “back-story” to curious customers. So I think there’s revenue potential from selling products with a clear, verifiable, measurable green back-story. And then there’s the related brand value from having the clearest green story. So I think there’s value in all four ways – risk, cost, revenue, and brand. But the risk reduction is clearly where the focus has been and will continue to be for obvious reasons.

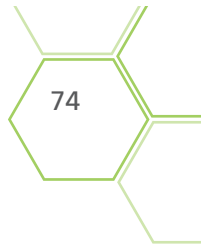
One of the biggest challenges companies face is just gathering data – actually getting the information because the reality is, if you say to your supply chain, “Hey, what’s your carbon footprint?” the problem is that most companies don’t know it themselves, so it’s not like they’re withholding information. We’re still at a place that I think is almost antiquated in how we measure – I know a lot of big companies, very technologically savvy companies that collect their own facilities energy use by e-mailing their utility bills around to somebody who puts it in an Excel spreadsheet. It’s insane. And that’s, in some cases, state of the art. But this area is moving quickly, and there are IT companies and software companies out there pushing to solve this problem. There are other more subtle concerns like proprietary information and how much can you share, but data is definitely the main problem.

One of my favorite supply chain stories that is also in Green to Gold is Herman Miller and the building of their new chair a few years back, the Mirra Chair, and creating this database for all the materials involved. It was basically supply chain information. They asked all their suppliers for data on what was in everything, down to the chemical level. And at first, suppliers were like, “Well, we don’t want to tell you. That’s proprietary.” But Herman Miller said, “Well, fine. We’ll go somewhere else.” And they were big enough to get that information, basically. But it wasn’t really that much of a concern because Herman Miller makes a chair. Someone tells them what’s in each wheel, or lever on the chair, it’s not like they’re not going to compete and make their own.

The problem that happens when you take retailers like Wal-Mart or others pushing for information is they make generic versions of products. It’s actually far stranger when they say, “Tell us what’s in everything” because they’re actually competing on some level. So there’s some weird stuff there that has to be worked through. And I think there’s some stuff at the industry level where companies and competitors have to work together and decide how much they’re going to share from their entire supply chain.

The tech industry is doing a lot in this area too – they’ve got an industry-wide supplier code of conduct, the EICC. I think the tech and electronics industry is an interesting example of an industry saying across their value chain, “Hey, let’s all get together and reduce the footprint because we need to, and we have to do it together.” So I think there’s activities going on now that are pretty impressive up and down the chain.

There are many different kinds of metrics out there. Companies are trying to coalesce around some basic ones using things like the Global Reporting Initiative, some systems that have been put out there and some guidelines for everyone to agree on set standards. There are some obvious ones: energy use, water use and renewable energy use. When you get into toxicity it gets tough. When you get into product content, it gets very tough.



There are lots of issues around where you draw the boundaries on a lifecycle study, who's responsible for what part of it. I think companies that try to keep it simple, at least with their supply chain, and just look at a handful of basic metrics: how much energy do you use, how much water, how much toxic or hazardous waste, how much total waste – keep it to about ten key metrics – are going to do better.

There's a lot of competition now for software programs. There are a lot of them out there that are trying to help companies calculate a carbon footprint across the value chain. I just finished a new book that's coming out this summer called Green Recovery, which is about how to go green in a recession. And there's a whole long story in there about a retailer that has been working with a new startup company on getting together data and metrics on their carbon throughout their supply chain. This is one area that people are really spending a lot of time, energy and money on – to try to track down full value chain carbon data and then use that information to make better strategic decisions. There's real value in knowing your business better, knowing where your impacts are, knowing that if carbon gets priced, which it will, what that will do to your distribution chain for a lot of different products. It's helpful to know which products will get a lot more expensive with carbon pricing.

There's some standardization of metrics going on within several industries. And again, the GRI is probably the most common, systematic reporting program that people seem to be following, but currently there's not anything that's considered standard, like what exists for financial metrics. There's FASB and the SEC – you have to report your income statement, your balance sheet, your cash flow statement, etc. We need that for sustainability metrics, and we're not quite there yet.

Mitch Greenberg

Manager
EPA SmartWay Program



“Ultimately it’s a good sign of management if a company is aware of sustainability and can improve on sustainability, because there’s money to be saved there.”

The SmartWay Transport Program, which the EPA established in 2004, has two sides: a heavy-duty freight program, and a light-duty passenger car program, but I’ll focus more on the heavy-duty freight program here since it is more relevant to the topic. The heavy-duty freight side is more complex, of course, because moving freight and supply chain systems is more complex than passenger transportation. As part of the program, we evaluate technology – things like idling control technology, low rolling resistance tires, better aerodynamic systems – and have a tractor and trailer certification program to help improve transportation efficiency and reduce greenhouse gas emissions. SmartWay certified tractors and trailers need to be somewhere in the top 20 percent of performance to qualify. We work directly with carriers (trucking companies or companies with their own trucking fleet) and shippers (companies that hire carriers to transport their goods).

In this side of the program, we invite carriers to measure their environmental performance with a tool that we provide them, which allows everyone to measure the same way, creating a level playing field. Those companies that volunteer to make these measurements are then challenged to improve their environmental performance and they use our tool to measure the amount of performance they could get from using different technologies or strategies.

The shippers’ main role is to use more carriers that are a part of the SmartWay program. We create this market relationship between shippers who are looking for more sustainable transportation companies to partner and contract with, and then we work with those trucking companies, carriers, and even logistics companies who are willing to improve their performance, which we then showcase back to the shippers. So, our program ultimately creates a nice market-based relationship between the drivers of supply chain systems, shippers, and carriers.

The American Trucking Association (ATA) represents a lot of larger trucking companies that most people recognize, companies like FedEx, UPS, Schneider, Swift, JB Hunt, etc. The ATA and most of the trucking industry in general has dramatically supported the SmartWay program for a number of reasons, but mainly the fact that we’re trying to get them to be more fuel efficient, which is clearly in their best interest because fuel is the number two, if not the number one, cost for a trucking company. We currently have just fewer than 2,000 partners in the SmartWay program. The majority are trucking companies; approximately 1,400 of our partners, which includes almost all of the top 100 trucking companies in terms of size and revenue in the U.S.

We also have a great deal of support from a specific cross-section of shippers, companies like IKEA, Sharp Electronics, The Home Depot and Lowes, IBM, etc. Shippers are a smaller set of our partner companies, and that makes sense, because there are many trucking companies for each shipper. But I think those companies on the shipper side have a good understanding that sustainability is going to be a key issue for their businesses in terms of their shareholders, their venture capitalists, their insurance folks and their customers. Ultimately it’s good sign of management if a company is aware of sustainability and can improve on sustainability, because there’s money to be saved there.

“We need a consistent protocol so that we can create a level playing field... Is a company whose marketing their environmental performance really achieving the goals they say on some bipartisan protocol? That’s what SmartWay has created.”

Cost savings are mostly realized directly through fuel savings and less directly through maintenance savings as well. I think cost savings is the number one thing that brings companies to the table. An example of that is idling a long-haul truck, one of those big 18-wheelers, overnight. DOT regulations require that after truck drivers drive for so many hours, they must take a 10-hour break. Long-haul truck drivers pretty much travel greater than 500 miles, either across the country or up and down the coast. So if you’re a long-haul truck driver and you need to take a 10 hour break after a day’s worth of driving, and if it’s summer, or winter, or you want to run your computer, or watch TV, or warm up a meal in the microwave, you’re going to need power. And the way truck drivers in the U.S. have done that is they have kept their 400 or 450 horsepower engine on while they’re idling their truck for their rest period.

A diesel engine like that will burn about one gallon of diesel every hour it’s at idle. So a 10-hour idling period is ten gallons of diesel at three bucks a gallon – you can see how this is a very expensive practice. Idling though is pretty reasonably controlled through technologies or even just business strategies. A company has to be willing to, number one, measure how much idling they’re doing, and then commit to some type of solution, which may require some investment. The key to saving money in this case is making sure that the investment is paid off by the fuel savings, and that’s the key to the whole cost savings concept in SmartWay. We want to make sure that we can provide a good business solution to reducing fuel consumption and greenhouse gas emissions. Idling is probably the best example of how to quantify that, and so cost savings is the number one reason, I think, why the industry has gotten involved.

In addition to the cost savings, trucking companies receive exposure for doing more for sustainability. So, if you’re a trucking company that’s committing to, say, reduce all of their idling, we can quantify the emissions benefits, the fuel savings benefits, and the monetary benefits to the trucking company and then help showcase that trucking company to shippers. So, what we’re trying to do here is in addition to the traditional business factors that would allow a shipper to hire a carrier (on-time performance, safety, reliability, price, etc.) – we’re now adding sustainability to that list of factors in hiring decisions. By being added to the SmartWay list, there is a very big opportunity for trucking companies. All other things being equal, shippers are more likely to hire a SmartWay carrier than a carrier that is not on our list.

Shippers don’t necessarily see direct cost savings because the trucks aren’t theirs and the rate at which the goods are moved is a contract between the shipper and the carrier. The EPA does not get involved in pricing this. However, since we’re bringing a lot of shippers to the table that are trying to showcase that they’re more sustainable to their insurers, their shareholders, their investors, and their general customers – they get that business edge by being able to market the fact that they’re trying to build a more sustainable supply chain. What I’m also seeing evolve is that shippers are looking for ways to directly improve their supply chains – weight savings in their packaging, smaller package sizing, more creative logistics operations, modal choice (whether they ship by rail, truck, air or sea), and now in some cases through Smart Way tools – because they’re able to see some benefits, like cost savings, to directly improving their supply chains from a sustainability perspective.

Consistent metrics and measurement protocols are really important to anything like this, whether it’s SmartWay or just general marketing of environmental performance,

because there's so many ways to measure things. Companies, if given too much leeway, will showcase themselves as the most efficient, sustainable or "green" company out there. We need a consistent protocol so that we can create a level playing field and can see who's really doing what. Is a company whose marketing their environmental performance really achieving the goals they say on some bipartisan protocol? That's what SmartWay has created.

More specifically, we've created some spreadsheet software, we actually are in the process of redesigning it to be a more sophisticated, more complete tool, but in the first phase we offered both shippers and carriers a calculator. We call it the FLEET model, which stands for Freight Logistics Environmental and Energy Tracking, and we take a relatively straight forward inventory of the number of trucks, the number of miles travelled and the number of gallons consumed, which are pretty consistent with most protocols including WRI and others. So we get a good sense of the fundamental performance of the company. But what we also do is we take a technology and strategy survey of what is it that the company is adding to their fleet. For example: a measurement of how many hours their trucks are idling. Say a company idled one million hours last year and their goal is to cut that down to five hundred thousand hours next year – you can see what the direct environmental impact of that move would be because everyone's doing it the same way. The key there is for the company to track something they're in direct control of, and then what we do with the EPA tool is we apply the emission factors to the company's work. In short, SmartWay has taken the lead in creating consistent measurement techniques and protocols for carriers and shippers, as well as a tool for them to measure their sustainability efforts year after year, which allows the industry to make decent comparisons between two companies that are both claiming similar things.

We're also conducting qualitative assessments of trucking companies. For example, we give each of them a score that relates to how efficient they are based on our model assessment. We have three shipper index factors (.75, 1 and 1.25- the higher the better), which shippers can use to sort of "grade" the trucking companies. However, a shipper would have a hard time quantifying a supply chain emissions footprint based on our current qualitative grading system. So a shipper can opt to only work with carriers that have earned a 1.25, but cannot figure out how to reduce their greenhouse gas emissions by x percent next year, since they don't know what the greenhouse gas emissions were in the first place. So, the transition we're making is to a more quantitative assessment where we will, in addition to grading the performance of companies, also be able to supply grams per mile, or grams per ton mile, actual emissions performance of companies so that shippers can take the next step and quantify their emissions footprint. So for example, if a shipper is using ten trucking companies, and they know what the grams per ton mile performance of each of those companies are, and they're going to ship x amount of tons y amount of miles, that shipper can, under this new system, generate a greenhouse gas CO₂ projection of their transportation supply chain. Such quantifiable information is critical to the shipper, and that's where SmartWay is going next.

M.R. Rangaswami

Founder
Corporate Eco Forum



“That’s been the biggest revelation in many companies – the fact that they’ve got to work with their supply chain since that’s where most of this falls. You look inside and you can do all the cutting and efficiency implementations within your four walls, but if you’re contributing to only 20 percent of the issues, then you’re not going to realize the huge reductions you’re looking for.”

The Corporate Eco Forum is a membership-based organization made up of Global 500 corporate executives who are interested in advocating eco strategies. The forum’s membership consists of roughly 60 member companies with combined revenues of more than \$3 trillion. The objective of the organization is to move the eco-agenda forward by having peers share their experiences, both successes and failures, as well as best practices with each other. At our annual meeting, our members are able to physically sit down with each other, understand what their peers are doing and really come to general agreements on what works and what doesn’t work and then be able to take that back to their companies. We also do regular research reports, quarterly conference calls and weekly newsletters to supplement the annual meeting. So these are all ways of interacting and keeping up with our membership and providing them with tools and resources that they can utilize to move their sustainability agenda forward.

As far as the supply chain is concerned, we have about six or seven vertical industries represented in our organization: financial services, manufacturing, energy, high tech, consumer package goods and so forth. So if you look at many of these industries when companies have done self-assessments on where the greenhouse gases are coming from and what contributes to it, many of them have found that most of the emissions occur in the supply chain and not within the four walls of their company. That has led to a lot more focus being put on the supply chain itself because if companies are to curtail greenhouse gas emissions, it can’t be just done by personal sacrifice or cutting down only in their own backyard, but it has to go outside the bounds of the company. That’s been the biggest revelation in many companies – the fact that they’ve got to work with their supply chain since that’s where most of this falls. I think that’s something that needs to be stressed because it’s not apparent sometimes. You look inside and you can do all the cutting and efficiency implementations within your four walls, but if you’re contributing to only 20 percent of the issues, then you’re not going to realize the huge reductions you’re looking for.

Industries that have had more regulations put upon them have had to do more to comply. So in a sense, they’re further ahead. In industries where sustainability has been more voluntary, it’s depended on the leadership of that particular company whether it’s something they’ve gotten into. They might look at their supply chain and say, ‘how do we drive more efficiency,’ and that could be changing modes of transportation, it could be more collaboration with their partners, it could be optimization of their shipping and ordering process, etc.

The key way to look at it is that green is really a by-product of a more efficient supply chain. I don’t think people are looking at the supply chain saying, ‘We want a green supply chain.’ They’re looking at it saying, ‘We want to have a more efficient supply chain that is also green.’ Also, industries that have had tremendous pricing pressure have done more of this because they’ve had to cut costs. So although it depends on each individual industry and company, what they all have in common is that they are approaching their eco-initiatives from a value and efficiency angle. Another driver we’ve seen for some

companies in this space is improving their brand value. A lot of companies are embarking on supply chain strategies because the company has a brand image and a brand value, whereas suppliers may not be viewing brand the same way that a bigger company does.

I would say companies in the consumer package goods and retail segments seem to have had a lot more focus in this area. Some of it could be because of the Wal-Mart effect, while some of it has to do with just their companies setting out to differentiate themselves in the consumer markets and using sustainability as one of the key drivers in doing so.

A key take away is that companies need to look at the supply chain holistically, making sure that what they're doing in one area doesn't jeopardize something else. You might be driving efficiency and doing some things better in one area, but have unintended consequences in a different area as a result. Another key aspect is that there needs to be some good internal drivers and management commitment in order for this to work. As cliché as it sounds, a lot of these initiatives that are successful are in companies where they are driven from the CEO and management team down. So I think what most companies need to do is to make sure that the people who are in positions of responsibility up the chain of command all the way to the CEO really need to be standing behind and supportive of environmental programs.

We have also found that companies have to use a two-fold strategy; we call it the "carrots and sticks" approach. You have to offer your supply chain partners incentives (the carrots), and then you have to have a "big stick" that mandates your suppliers to comply. We've found in our membership base companies that using both effectively has had the most impact within their supply chains. Finally, one last key is communication with your suppliers – running training courses, having collaborative applications, facilitating regular interactions, developing long-term partnerships, sharing best practices – all these things. The whole communication program has got to be put together for these initiatives to work and it's one part companies don't always put enough emphasis on.

For companies just getting started, the first thing they have to do is an assessment. They need to figure out the current state of their supply chain footprint as it relates to sustainability. The problem is that most companies don't have all the information they need to make any kind of decision. Find out the implications of risk across the supply chain, for example. Articulate all the reasons why you're doing this, both to your own people and then be able to communicate that to your supply chain because you can't just go to them and ask them to do certain things without a reason. You have to explain to them why you're doing it and what the benefit are for both partners.

One of the weakest areas in all of this is the metrics and benchmarking. These have just begun and they have to be industry oriented because you can't compare apples and oranges. So there's absolutely opportunity to create industry metrics and benchmarks, but we're just in the beginning phases. This is one of the key parts of this whole close loop cycle because only once you measure what you have can you execute programs to monitor and mitigate it. This is an area that has ample scope for improvement and that IT and software systems can enable because most of this has to be automated.

Rick Blasgen

President & CEO

Council of Supply Chain Management Professionals



“...there is an enormous amount of discussion among our members on sustainability issues as they relate to the warehousing function, the transportation function, regulations in this country and others, and how supply chains can operate more green.”

As the President and CEO of the Council of Supply Chain Management Professionals, my colleagues and I have a great interest in assessing the need for visibility and sustainability in companies' supply chains. We represent many people around the world within logistics and supply chain roles. Our organization is a professional association of about 9,000 members worldwide who come from all walks of “supply chain” life – from students and academics to folks who are running large manufacturing and retail organizations, software and hardware suppliers, third party logistics providers, etc.

Because we are an organization that is devoted to logistics and supply chain management, we're not necessarily in any one vertical. So there is an enormous amount of discussion among our members on sustainability issues as they relate to the warehousing function, the transportation function, regulations in this country and others, and how supply chains can operate more green. There are a lot of companies now that have chief sustainability officers who either work in tandem with the supply chain organization or manage the supply chain itself.

So in this particular arena, there is a great degree of focus from supply chain executives on how they manage their supply chains to a greener state and how they participate in the industry in terms of working with regulators as opposed to just being regulated upon. As an association representing those folks, we are constantly trying to have “our ear to the rail” with regard to these kinds of issues and how we can get the latest research and trend information out to our members so that they can be aware of what is relevant within this space.

One of the major companies addressing the topic of sustainability is ProLogis, which develops and operates industrial facilities for logistics use. For the last several years, it has been focused on improving its own carbon footprint as well as creating sophisticated green buildings. In fact, their headquarters out in Denver is a completely green building in terms of its use of energy, and is LEED certified. Since January of 2008, all new ProLogis developments in the United States have been built to LEED certification standards. I believe this company is at the forefront in terms of real estate developers concerned with this whole notion, and they're doing this worldwide as well.

I know PepsiCo has presented on this numerous times within the industry with regard to its facilities. They have a facility in Chicago that, when completed in mid 2008, was the largest LEED-CI Gold certified building in the world. I understand IKEA has metrics to track its sustainability efforts, so there are a number of companies like these that have openly stated that they are trying to incorporate sustainability into their corporate culture. I have also seen presentations from UPS about its trucks. When they send them out onto the roads, they design their routes to make only right-hand turns to improve fuel efficiency as well as time, which I think is an interesting idea. If you go back to trucking deregulation in this country, people in logistics have consistently tried to minimize the amount of air and empty space that they are shipping around on trucks; in other words, logistics people who are progressive in this area have been green before “green” was even a term. They've been trying to minimize packaging, minimize empty miles on trucks and empty space in

“...logistics people who are progressive in this area have been green before “green” was even a term.”

warehouses, minimize the amount of time that a forklift rides without a load underneath it, etc. I think that advanced logisticians were looking for ways to be more productive and minimize things like the amount of time that a truck spends on the road with nothing in it, before environmental sustainability was even a platform.

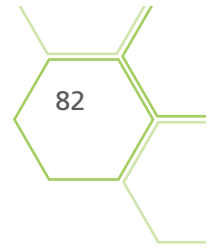
Take the recent economic downturn, for example. If you have a perishable product and are able to take out a large amount of inventory quickly, reacting to the lower volume, then you will have less spoilage and obsolescence costs due to the fact that you forecasted an initial sales target and ended up with extra inventory. I think that companies that are using sophisticated methodologies as well as visibility and forecasting tools to ensure that they are closely lining up supply with demand can take advantage of these wild swings in volume to the benefit of their supply chains, their companies, and their customers. Anything that can provide visibility across the entire supply chain is a benefit, particularly when you are operating a global supply chain where you have components coming from Asia or elsewhere being shipped all around the world.

I think that cost savings is a primary benefit of greening the supply chain. Everyone wants to reduce costs, but I think there are also other benefits like reduction in obsolescence and spoilage, and the ability to minimize the amount of time that inventory is at rest. If you have visibility across a very comprehensive supply chain and can share that visibility with your key participants within that supply chain, you are going to do a better job of keeping that inventory moving as opposed to just storing it for an inordinate amount of time, which reduces a number of expenses.

A major challenge in increasing visibility across the supply chain is scale – these technologies have to be scaled. For example, there are tests going on in the warehousing arena for companies that operate very large warehouses with solar roofs to find out how they can take advantage of the energy they are creating. If there’s excess energy, they are developing ways of sending it back to the grid, which is expensive at the moment. Another example is there are companies experimenting with capturing energy from the wind by building wind units on roofs. However, it is difficult to get these kinds of technologies scalable in terms of the capital expenditure. Nevertheless, utilization of such technologies is moving forward despite these hurdles.

The main concern is just the investment, and the timeframe for the return on investment. Take transportation as an example. There are a lot of companies that are producing tractors for large trailers that are much more efficient these days. They’re very expensive, but in the long haul, they can produce a benefit in terms of reduced fuel consumption, less emissions, etc. The EPA SmartWay program is the perfect example of an organization encouraging the use of these tractors. So it’s a matter of looking at the ROI like any other business proposition; what are the costs associated with it and what’s the return on investment? I think there’s a lot of innovation out there that is improving and is helping to uncover areas within the supply chain and within the company that are less efficient than they could be. In packaging for example, how can we produce products to prepare them for the material handling supply chain to ensure that there is less damage, etc? So there are a lot of off-shoots that come from initiatives like this that force companies to look at and uncover other areas that they may not have seen going into it.

Another problem is that you run into an economic downturn like this and right away companies get defensive and start talking about survival. Then some of these initiatives



can fall by the wayside because companies say they don't have the resources to devote to them. I think as we emerge from this economic cycle, we'll find a renewed interest in these areas and forward-thinking companies are going to continue to push the envelope in this space.

For companies just getting started in looking at sustainability across their supply chains, I'd suggest that they go seek out companies that have a successful record and are open and willing to share best practices with them. What was it that made them successful? Was it leadership? Was it managing assets? And they don't just have to be in your own industry; a lot of what we do is bring people together from different industries because they can find out that something can be applicable to their industry that they just haven't thought about. Seeking out people who are willing to share those experiences is very important. Also, if you're using third party logistics providers, whether they are in transportation or distribution center management, some of those people are very creative and can have access to some innovative solutions to bring to their other customers. So I think there is a big opportunity for companies to benchmark and learn from their peers.

Pamela J. Gordon

Founder/CEO

Technology Forecasters, Inc. & TFI Environment



“It’s obvious – when you reduce waste, you save money. You design products and processes to appeal to the increasing green-mindedness of corporations and customers, and you capture greater market share.”

I am an author and consultant in the area of electronics manufacturing and environmental strategy.

Electronics manufacturing these days has a very long supply chain compared to the 1950s, 1960s, and most of the 1970s when most companies conducted everything in-house from semiconductor design, to assembly, test, marketing, support, etc. Because these steps are no longer conducted under one roof, it’s vitally important that responsible players in the industry select suppliers for raw materials, components, printed-circuit-board and product assembly, transportation, reuse and recycling with responsible environmental practices. It’s important not only to comply with regulations but also to go well beyond regulations to reduce environmental footprint on a voluntary basis.

Our role as consultants, as was presented in my book *Lean and Green: Profit for Your Workplace and the Environment*, is to help electronics companies reach the successful intersection of reducing environmental impact and increasing profits. Our approach is to work with a VP or higher-level sponsor at the company to create a multi-functional “green team” that positively changes the entire dynamic of the company. It has such far reaching effects as to rethink processes; look for and reduce waste; eliminate entire steps that are not needed; move products around the world a lot less; make products that are smaller and lighter (which has positive repercussions up and down the supply chain); and create new revenue models such as leasing and take-back.

Suppliers have a couple of motives to cooperate with corporate customers’ environmental programs. One is they want to continue to have customers and most of them realize it’s not just Sony, Philips, Nokia and HP who are requiring green activity – it’s more and more companies every day. The second motive is arriving at that intersection of reducing environmental impact and profiting from it. It’s obvious – when you reduce waste, you save money. You design products and processes to appeal to the increasing green-mindedness of corporations and customers, and you capture greater market share.

Product companies have a huge responsibility to design products that are competitive and feature as many design-for-environment elements as possible. If we include the mainly Asia-based original design manufacturers (or ODMs), their role includes design as well as manufacturing. Their responsibility is to be up with the latest and upcoming environmental regulations and to be in continual dialogue with their customers regarding their environmental expectations. For example, we help our clients prepare environmental-performance sections of their quarterly business reviews (QBRs) with their suppliers. We help them to communicate to as high a level at their suppliers’ organizations as possible about their environmental expectations of suppliers – past, current, and future – so that the supplier can keep up with the environmental roadmap of their customer. In turn, these suppliers should do the same thing for their suppliers. When the customer involved has the education, open communication, and clarity of expectation, then hopefully by employing best practices up and down the supply chain, the supplier will meet the customer’s expectations.

“With greater visibility, the OEMs are better able to discern environmental attributes and thus add that to the mix of important issues when choosing suppliers.”

Large semiconductor companies, for example – including Intel, AMD, and NEC – are exhibiting exemplary practices not only in compliance, but also beyond compliance, reducing environmental impact in creative, aggressive, and serious ways. Among the electronics contract manufacturers I see Celestica as having a deeply rooted culture – founded from its IBM heritage – in environmental consciousness, action, and leadership. Elcoteq, a large contract manufacturer based in Europe, is a leader environmentally as well. Most of the other contract manufacturers are doing their best to comply with regulations, but have had a difficult time convincing their senior executives that a beyond-compliance environmental initiative will be profitable for them.

Many OEM companies have added “environmental responsibility” to their short list of attributes with which they choose among suppliers. With greater visibility, the OEMs are better able to discern environmental attributes and thus add that to the mix of important issues when choosing suppliers. Suppliers who are not providing their customers with sufficient environmental data or who are providing responses lacking substance, history, and measurable improvements (often called “green wash”), are going to be nudged out of the competition by OEMs who are increasingly serious about rationalizing their supply base according to environmental (as well as other) criteria. This will be a surprise to a lot of companies in the supply chain. Expect some painful awakenings, but hopefully with education corporate customers will give suppliers sufficient warning to get on board.

The first challenge facing OEM companies is to drive their own organization’s awareness and commitment to adding environmental responsibilities to the criteria in selecting and rationalizing suppliers. To jump this hurdle quickly, they should use a multi-functional approach involving product designers, supply chain, manufacturing, logistics, marketing, and an executive sponsor. The second challenge is to get honest responses from suppliers. There are numerous questionnaires available that elicit the aspects of environmental compliance, as well as corporate social responsibility, health, safety, labor, etc. It is sometimes difficult for the OEM to discern which of the supplier responses are robust and genuine, and which are not. I’ve heard even very well respected suppliers in the electronics industry tell me that when corporate customers ask them about their environmental programs, they are tempted to lie, because they have not yet successfully convinced their executives to launch an effective beyond-compliance strategy. The third and final challenge for OEMs is educating the suppliers on best environmental practices, especially educating the mid-sized and smaller suppliers who have fewer resources. It’s a lot to ask the OEM to educate suppliers’ executives about stepping up to not only compliance, but also beyond compliance for Lean and Green benefits.

The best place for companies to start is to form a highly empowered, multi-functional / multi-regional team in their organization comprising R&D, engineering, supply chain management, operations and logistics; I recommend including marketing, facilities, and HR as well. This Green Team, under VP or SVP leadership, will determine how to best reduce their environmental impact. The next recommendation I would make through the efforts of the multi-functional team is to choose an environmental supply-chain questionnaire that is as standard as possible (instead of developing one from scratch); for efficiency, choose one that likely their suppliers have filled out before from other customers. Lastly, I recommend conducting surprise supplier audits. It can be expensive, but even if companies are able to audit only a few suppliers each year, they are effective if they are surprise.

Elements of these questionnaires and audits include to what degree suppliers have been reducing their use of energy, water, chemicals, and consumable materials. It's not just the product itself, but it's also the materials and substances that are used in the manufacturing process that don't end up in the final product. Where does the product come from? Where does it go? Some of them are looking at their carbon footprint – more specifically scopes 1, 2, and 3 as outlined by the Carbon Disclosure Project (www.CDPproject.net). Only the leaders are yet measuring Scope 3; though this will be an expectation in the coming months and years.

HP and Phillips have been doing an exemplary job of scrutinizing their supply chains for environmental and social responsibility. Even several years ago, one of our manufacturing-operations clients at a division of Phillips told me, 'Our corporate environmental auditing department just disqualified one of my favorite suppliers.' But inherent in his 'complaint' was that he was proud to work for a company that would go that far to disqualify an irresponsible supplier, even if that supplier performed well in other areas. Nokia, Sony, and Motorola are other exemplary large companies environmentally, and some mid-sized and smaller OEMs are leading the way as well. May the list of electronics OEMs that realize business benefit from substantively reducing environmental impact continue to grow.

Bruce Rayner

Former Editorial Director and Publisher
CMP Media LLC



“...virtually all companies are walking the fine line between trying to maintain profitable operations and ,doing the right thing,”

I've been in publishing since the mid 80's, running magazines, newspapers and weeklies mainly in the electronics industry, so I have a deep background in electronics from an observational perspective. Over the past 20 years I have witnessed the industry mature, and the extreme highs and lows of the tech business cycle. The last high was in the late 1990's with the dot com bubble, and then the crash of 2001 and 2002. After recovery and fairly healthy markets between 2003 and 2007, the current downturn has been the most significant decline in the industry historically. During that time there's been a transition from an industry that consisted of highly integrated companies - everything under one roof - to one that relies heavily on subcontracting and outsourcing. Companies like Tektronix, for instance, an oscilloscopes manufacturer up in Beaverton, Oregon, used to make everything from the chips all the way through to the end product. That was a fairly common strategy back in the 70's and 80's. Then in the 90's we saw a shift in manufacturing away from the regional model towards outsourcing to places like China and Eastern Europe. So, you have this increased complexity in the relationships from a monolithic structure to much more of a distributed arms-length relationship between all of the supply chain players. In turn, managing those relationships has become increasingly difficult and the importance of good communications and good business relationships has become paramount.

In the early part of this decade we also saw the emergence of broad environmental regulation in the electronics industry. In Europe, in particular, there was the emergence of the ROHS and WEEE standards in the middle of the decade, and then more recently the REACH regulations out of Europe that are going to require more management, control and documentation relating to chemical use.

We launched GreenSupplyLine.com in 2004 in response to these increased regulatory requirements being placed on the industry by the European Union. We designed the website to help companies understand their obligation to comply with these new complex EU directives.

As the WEEE and ROHS regulations became law and were integrated into company design, supply chain and manufacturing procedures through 2006 and 2007, we realized there was a need to expand our coverage of environmental issues as they relate to the electronics industry to coverage of how companies could take advantage of these opportunities in their sector. For example in the automotive sector – fuel efficiency, variable speed motors, LED's, flat-panel displays, battery technology, hydrogen fuel cell, and so on have presented huge business opportunities for the industry. At the same time, we also saw the need to improve coverage that would help companies manage their environmental footprint from a supply chain standpoint.

In the past, there was often a disconnect between what the OEM, the final manufacturer of the product, was doing in their internal operations, and what their outsource partners were doing in terms of environmental compliance. That's still an issue – only in the past few years have companies really started to get their heads around it. On the one hand the OEM's want to get the lowest cost and are always beating up their suppliers to get

“The biggest challenge for companies right now is maintaining their environmental commitment in the face of the current economic downturn.”

the lowest cost. Yet at the same time their consumers, especially in apparel and other consumer products, are demanding that these companies be better environmental stewards. Unfortunately, those two things are in opposition. It costs money for suppliers to be more environmentally responsible, because of the cost mechanisms they have to have in place to measure the amount of waste and chemicals that they use. So, there's this constant tension between those two things that companies are grappling with, in addition to compliance with the regulations that are being imposed. But for the most part companies, OEM's in particular, are kept in check by the consumers. Back in the late 90s there were press reports of companies deploying Pakistani kids to dye their t-shirts or make their soccer balls, for instance. But public outrage about corporate social responsibility caused companies to take a closer look at their sourcing and supply chain relationships and improve the conditions. The same thing is happening with environmental issues today.

For example, 60 Minutes just did a report about electronic recyclers that ship TVs, computers and other electronics to China where they are disassembled by hand, exposing workers to incredibly toxic chemicals in the process. That is a perfect example of the tension between wanting the lowest cost and wanting to be environmentally responsible. Companies like HP, IBM and Intel are part of the Electronics Industry Citizenship Coalition (EICC), which helps electronics companies create ethical and environmentally responsible guidelines for dealing with these supply base issues. But these and virtually all companies are walking the fine line between trying to maintain profitable operations and “doing the right thing.”

And we're not only seeing this trend in the electronics industry, but in other industries like apparel, which I have seen at the company that I launched last year, Athletes for a Fit Planet. We provide consulting and support services to large marathons and athletic events to help them become more environmentally responsible. Apparel has been leading the way for the last couple of decades in many of these supply chain relationships, in terms of trying to get their supply chain partners to become more environmentally responsible. There's an organization called Climatecounts.org, which has developed a scorecard that ranks companies based on their performance across a set of sustainability efforts. But even the companies that are far along and receiving good press around their green and social efforts, are in the 50-60 point range out of a total of 100.

One of the companies that is doing a phenomenal job according to the Climatecounts.org scorecard is Nike. They have a very strategic approach to environmental stewardship programs, starting with the chemistry and materials used in the manufacturing of the product. Nike has solutions for all of the pieces of the puzzle – from chemistry through product design, manufacturing, distribution, packaging to sale and even afterlife take back – but they obviously don't own all of these parts. They outsource all over the world, but they have some consistency in the way that they approach these matters – for example, converting to materials that are less environmentally damaging or improving manufacturing processes so they're not as toxic or don't use as much water.

There are also standout companies in the food business like Stonyfield Farm. If you look at their website it's astonishing how much they've thought about things like packaging from an environmental standpoint. And unlike companies like Wal-Mart, Nike and Gap, which have learned from their mistakes and responded to negative press in the past by taking a 180 degree turn and making dramatic changes in the way they operate,

environmental responsibility has been a significant part of Stonyfield's culture from day one. It's at the core of the company's business philosophy.

Though Wal-Mart continues to get plenty of bad press from local community groups, they have made huge strides in recent years to become better environmental stewards. And because of their global purchasing reach and influence, Wal-Mart's environmental impact has been profound because by making a simple change in their purchasing policies they can transform the entire industry. Case in point is their decision to sell nothing but EnergyStar appliances or use CFLs and LED lighting in their stores.

The biggest challenge for companies right now is maintaining their environmental commitment in the face of the current economic downturn. And it's probably going to be a tough balancing act for at least another twelve months. We wasted eight years under the Bush administration getting a start on dealing with the climate issue, and that's eight years that we couldn't really afford to waste. Now we're faced with a situation where, according to leading scientists, we have about 20 years to bring the CO2 emissions down to something that is closer to the 350 parts per million level. The question is whether that's even a realistic expectation. We've lost momentum and the economic situation isn't helping. The problem is that there are no national regulations, at least not yet, but I definitely think there will be. The pendulum swung too far towards free market mechanics and lack of regulation and now I think there'll be an overcompensation back the other way towards regulation.

The standards that currently exist for environmental compliance include ISO 14000, which a lot of companies are using these days – but ISO standards are more along the lines of quality and process control. Then there's the Electronics Industry Code of Conduct (EICC), which has an entire category dedicated to environmental requirements, but there's nothing really binding about the EICC requirements, which is why binding and prescriptive regulations like the EU's ROHS, WEEE and REACH are probably the most important out there right now.

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