Aberdeen Group
A Harte-Hanks Company

Supply Chain Visibility Excellence

Fostering Security, Resiliency, and Efficiency

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Executive Summary

The increased complexity of global supply chains has led to longer lead times, more pipeline inventory, and the need to control downstream and upstream logistics. In our most recent supply chain visibility survey, the growing supply chain complexity was the top business pressure (44%). This, in turn, has contributed to increased supply chain management costs. It is not surprising that in the situation of global economic turmoil that visibility is taking center stage. This report focuses on gaining visibility into critical elements across the end-to-end logistics network for improving cost and service. But before a company can reduce inventory or landed cost, it needs visibility into them. Only then can it apply tools to agilely adapt to the information it collects.

Best-in-Class Performance

The following criteria were used to distinguish Best-in-Class companies:

- 96% of orders delivered to customers complete and on time
- 96% of orders received from suppliers complete and on time
- Decreased by 3% total landed costs per unit in the past year
- Decreased by 3% supply chain execution cost relative to revenue

Best-in-Class companies have, compared to Laggards, a 25 percentage point higher complete and on time delivery to customers and a 12 percentage point greater advantage in year-over-year unit landed costs.

Competitive Maturity Assessment

Best-in-Class companies are:

- 1.7-times as likely as Laggards *to have online visibility into inbound in-transit shipment status and* 56% more likely than all other companies (the Industry Average and Laggards combined) to have *online visibility into accrued supply chain costs*
- 1.6-times as likely as all others to adopt commercial TMS or BI solutions for supply chain visibility
- Almost twice as likely as all other companies to have *online trading partner collaboration and enablement*

Required Actions

In order to move toward a more connected and visible end-to-end supply chain, companies should:

1. Extend visibility within and beyond their enterprise
2. Utilize dynamic business intelligence and decision making
3. Move to security, resiliency, and efficiency in supply chain execution

Research Benchmark

Aberdeen's Research Benchmarks provide an in-depth and comprehensive look into process, procedure, methodologies, and technologies with best practice identification and actionable recommendations

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Chapter One:
Benchmarking the Best-in-Class

Business Context: Visibility Takes the Global Stage

About a year ago, Walmart announced its plans to embark on an inbound supply chain collaboration initiative (Kelly Abney, Walmart VP Corporate Transportation presented a keynote on this initiative during Aberdeen's 2010 Supply Chain Summit). Walmart and some of it's onboarded suppliers will talk about program requirements and progress in Aberdeen's upcoming Supply Chain Management Summit. Of particular note, supply chain visibility is a key requirement that is prerequisite and central to the success of the Walmart initiative and this prerequisite extends to companies of all sizes, scale, and industry segments. It is crucial to the success of any multi-party supply chain transformation.

Numerous Aberdeen studies have indicated the importance of supply chain visibility (see Appendix B: Related Research) and the importance is only amplified for those with global supply chains and partners (Figure 1).

Best-in-Class companies are:

- √ **51**% more likely than all others (the Industry Average and Laggard companies combined) to gain visibility into international *outbound* shipment status within hours
- √ **57**% more likely than all other companies to gain visibility into international *inbound* shipment status within hours

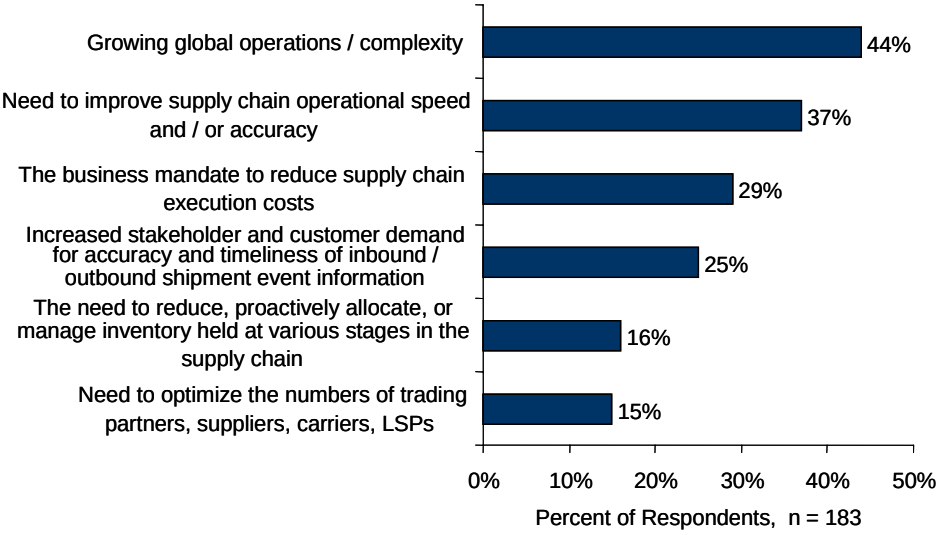
Figure 1: Global Supply Chain Execution Challenge

Source: Aberdeen Group, February 2011

This report focuses on the logistics network as the core component of the integrated demand-supply networks in Figure 1, outlined in Aberdeen's earlier study (*Integrated Demand-Supply Networks: 5 Steps to Regaining Visibility*

and Control, March 2009). So what are the key drivers for focusing on improving visibility in the context of the complex global logistics and distribution network? Figure 2 shows that operational pressures of growing global operations and complexity (44%), and the need to improve speed and accuracy (37%) are top of mind.

Figure 2: Top Pressures to Improve Supply Chain Visibility



Source: Aberdeen Group, February 2011

The increased complexity of global supply chains has led to longer lead times, more pipeline inventory, and the need to control downstream and upstream logistics. This, in turn, has contributed to increased supply chain management costs (supply chain execution at 29% is the third highest priority). It is not surprising that in the situation of the global economic turmoil, many companies have turned to their supply chain organizations in search of ways to cut costs, while enabling faster and more efficient responses to changing customer demands.

Reducing costs by driving down excessive inventory and avoiding or quickly responding to disruptions has become critical for companies in today's economy. Walmart's initiative extends to a supplier base that is both global and massive, but, regardless of scale, collaboration with your supply chain partners is no less important. But before a company can collaborate or partner with others to reduce pipeline inventory or landed cost or improve lead-times, it needs to have visibility into them.

Note: Pipeline Inventory

Pipeline inventory includes inventory in-transit and in temporary staging

The Maturity Class Framework

Aberdeen has used the following metrics to determine Best-in-Class, Industry Average and Laggard performers in this study:

- Inbound is the percentage of orders received from suppliers complete and on-time

- Outbound is the percentage of orders delivered to customers complete and on-time
- Change in total landed costs per unit shipped over the past year
- Change supply chain execution cost as a percent of revenue (inbound /outbound transportation, pipeline and staged inventory and SC management costs over the past year)

This set of metrics is balanced across delivery / service, inventory and cost-related performance, and reflects the key criteria by which an organization would measure its own supply chain management efficiency and through which it would be evaluated by customers and supply chain partners.

Table 1: Top Performers Earn Best-in-Class Status

Definition of Maturity Class	Mean Class Performance
Best-in-Class: Top 20% of aggregate performance scorers	▪ Experienced a 3% decrease in supply chain execution cost as a percent of revenue (inbound /outbound transportation, pipeline and staged inventory and SC management costs) ▪ Possessed a perfect order rate of 96.0% delivered to customer ▪ Possessed a perfect order rate of 96.3% received from suppliers ▪ Experienced a 3% decrease in total landed costs per unit handled
Industry Average: Middle 50% of aggregate performance scorers	▪ Experienced a 3% increase in supply chain execution cost as a percent of revenue (inbound /outbound transportation, pipeline and staged inventory and SC management costs) ▪ Possessed a perfect order rate of 90.5% delivered to customer ▪ Possessed a perfect order rate of 87.6% received from suppliers ▪ Experienced a 2% increase in total landed costs per unit handled
Laggard: Bottom 30% of aggregate performance scorers	▪ Experienced a 8% increase in supply chain execution cost as a percent of revenue (inbound /outbound transportation, pipeline and staged inventory and SC management costs) ▪ Possessed a perfect order rate of 71.0% delivered to customer ▪ Possessed a perfect order rate of 73.1% received from suppliers ▪ Experienced a 9% increase in total landed costs per unit handled

Source: Aberdeen Group, February 2011

Table 1 depicts that Best-in-Class companies are:

- Significantly better than Laggards in ensuring their customers are serviced well: their percentage of complete and on time orders

delivered to customers of 96% is 25 percentage points higher - a large gap in an environment where companies are moving towards more customer-driven supply chains and customers often evaluate their suppliers based on their performance in these metrics.

- More successful in reducing their year-over-year landed costs per unit (an almost 5 percentage point gap with Laggards) - they were able to combat fuel and reduce this cost by 3% versus last year, a big advantage in today's cost-conscious business climate, when firms try to drive out as much cost as possible from their bottom lines.

The Best-in-Class PACE Model

Improving supply chain visibility to achieve corporate goals requires a combination of strategic actions, organizational capabilities, and enabling technologies that can be summarized as shown in Table 2.

Table 2: The Best-in-Class PACE Framework

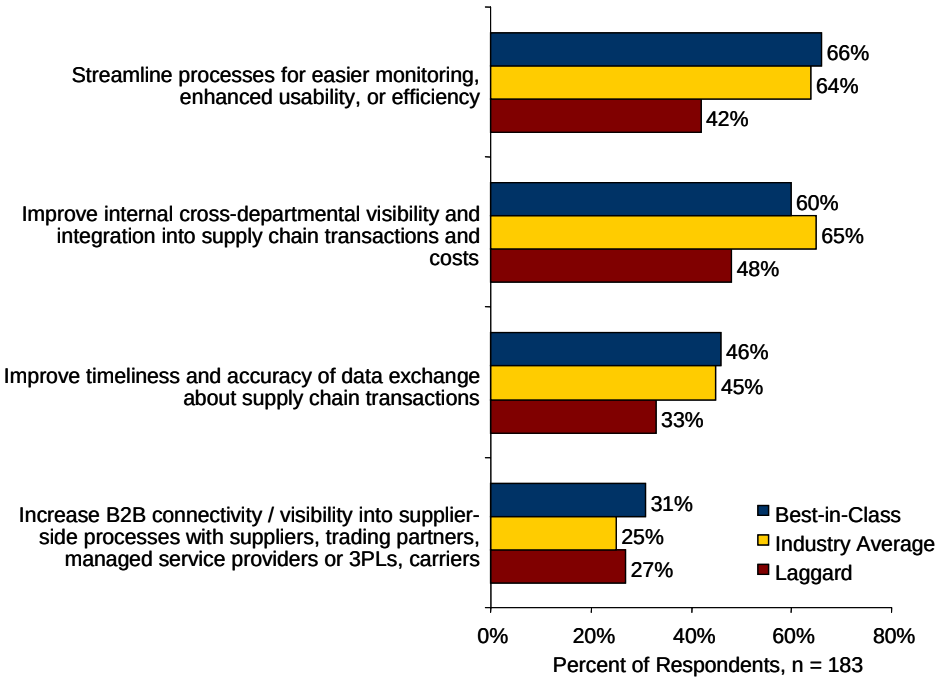
Pressures	Actions	Capabilities	Enablers
▪ Growing global operations / complexity (e.g., longer lead times and lead-time variability, or expanding need to gain visibility to manage /monitor / secure product within each shipment)	▪ Improve internal cross-departmental visibility and integration into supply chain transactions and costs ▪ Purchase and / or upgrade technology solutions to automate portions of the process	▪ Standardized enterprise-wide supply chain planning, and execution processes ▪ Vice president or higher-level executive accountable for profit-and-loss (P&L) for Supply Chain Execution ▪ Customer- and product-specific Supply Chain data is captured and analyzed over time ▪ Automated financial reconciliation and supply chain performance analytics	▪ ERP system module ▪ Business intelligence software ▪ Supply Chain planning system with item-level integration to ERP ▪ Visibility and event management software (event tracking + workflow and escalation mechanisms) ▪ Data integration and cleansing tools ▪ Transportation Management Software (TMS) with event management capabilities ▪ EDI/VAN communication with carrier and suppliers, trading Partners ▪ Multi-carrier booking portals ▪ Single-carrier booking portals

Source: Aberdeen Group, February 2011

Best-in-Class Strategies

The following are key strategies employed by the various companies according to their maturity class. As indicated in Figure 3, Best-in-Class and Industry Average companies are very much in agreement with the priority that they are placing on the top four strategic actions. But Laggard companies have a ways to go particularly on the top two; they are 50% less likely then their peers to place focus on *streamlining their processes* and they are 31% less likely to *improve the timeliness and accuracy of data exchange about supply chain transactions.*

Figure 3: Strategic Actions for Improving Visibility



Source: Aberdeen Group, February 2011

So while all companies have similar objectives as to the overall focus of their visibility initiative, this does not mean that they are all performing at equal levels. Two important areas of difference across the classes lie in the presence (or lack of) visibility to: 1) more granular events such as events tracked at the Stock Keeping Unit (SKU) levels, and 2) the upstream suppliers' supply chains. This again follows from the priority gaps between the Best-in-Class versus all other companies (the Industry Average and Laggards combined) where they are:

- **1.42**-times as likely to outsource parts or all of supply chain visibility execution
- **1.21**-times as likely to increase B2B connectivity / visibility into customer-side or the outbound processes
- **1.19**-times as likely to increase B2B connectivity / visibility into supplier-side or the inbound processes

The Aberdeen Insight to follow provides further details on the areas of differentiation of the Best-in-Class performers: companies need to focus on those areas regardless of their specific visibility initiative.

"We are very close to the retailers. When their customers ask for certain products, the retailers often check our website to determine which inventory is readily available for pick up or have delivered from us once or sometimes twice a day. Many of our orders are received online and therefore, it is critical that we have product available on our shelf just like a retailer"

~ VP Supply Chain, Large Distributor

Aberdeen Insights — Three Key Focus Areas for Supply Chain Visibility

The survey findings strongly suggest that most supply chain professionals understand the need for greater visibility - and the benefit of supply chain intelligence - in the supply chain. In determining the strategy for supply chain visibility enhancements and the tactical improvement plans, companies need to strongly focus on the following three areas:

- **Granularity**. Best-in-Class companies are 40% more likely than all others to have either lot (batch / set / parcel) or SKU level visibility into inbound pipeline inventory 53% versus 38%. The Best-in-Class companies are also 41% more likely than all others to have either lot (batch / set / parcel) or SKU level of visibility into outbound pipeline inventory (69% versus 49%).
- **Time-to-information**. Shippers need to ensure that not only all of the critical milestones are tracked, but also that the information is obtained fast enough. Best-in-Class companies are 57% more likely than all other companies to gain visibility into international inbound shipment status within hours (as opposed to days or longer).
- **Data quality and cleansing.** The Best-in-Class are 85% more likely than all other companies to report that data obtained during supply chain monitoring is accurate over 90% of the time.

As a result of superior process and technology capabilities, coupled with a stronger focus on data granularity, quality and timeliness, Best-in-Class companies are between 19% and 42% *more likely to respond to non-catastrophic supply chain disruptions within hours.* If a shipment gets held up at a foreign port, they will be notified of this delay within hours and will not miss the opportunity to re-plan the route to resolve the issue fast enough.

Aberdeen research has shown that most companies find it difficult to keep pace with their increasingly global logistics with their limited automation. Chapter Two of this report examines what the top performers are doing to achieve these gains across people, process and technology.

Chapter Two: Benchmarking Requirements for Success

Visibility into critical activities and milestones is a necessary infrastructure element for managing supply chain processes. As this study shows, Best-in-Class companies are more likely to have granular visibility into critical supply chain processes and events, which help them gain better control of their supply chains. The following section will examine the capabilities and enablers necessary to achieve this visibility.

The following case study illustrates a business transformation and supply chain visibility initiative at a large brand name global apparel company.

From Black Hole to Extended Visibility: Large Apparel Firm launches SCV platform, gains Control

Levi Strauss & Co. is a casual apparel company with annual revenues of $4.5 billion and operations in over 110 countries worldwide. Levi Strauss & Co. designs and markets jeans, casual wear and related accessories for men, women and children under the Levi's®, Dockers®, Signature by Levi Strauss & Co.™, and Denizen™ brands. Levi Strauss & Co., which has been a presence for over 100 years, sells its products through a variety of channels including chain retailers, department stores and online sites. Levi Strauss & Co. also operates 470 company-owned stores in 27 countries worldwide.

By all accounts, supply chain management is growing increasingly complex. In fact, the most recent Aberdeen survey on supply chain execution found that growing supply chain complexity was the top concern of supply chain professionals complicated by multi-channel and multi-party logistics needs. This concern only grows in importance for companies, like this apparel company, which takes a more holistic view of the supply chain. "For us the supply chain goes beyond managing products moving from point A to point B across a multi-tiered supply base. For us, supply chain visibility includes demand planning, product design, and product engineering," said Sanjay Mishra, Director, Inbound Logistics and Strategy, Levi Strauss & Co.

While many companies have pulled back on investment in supply chain infrastructure improvements, Levi Strauss & Co. has stayed committed to a multi-year infrastructure improvement plan rolling out a global ERP backbone which began few years ago. The improvement plan included the implementation of a large scale transportation management system in the US. "Before this implementation we were doing many critical processes manually. This put a strain on our operational efficiency and resulted in an overall lack of visibility to our products," explained Mishra.

continued

Best-in-Class companies are:

- √ **2.78-times** as likely to have online visibility into sustainability / green metrics (e.g., environmental impact, carbon footprint, energy efficiency, etc.)
- √ **2.28-times** as likely to have online visibility into supply chain disruptions
- √ **2-times** as likely to have the ability to analyze the current level of supply chain risk exposure
- √ **1.94-times** as likely to have online visibility into the customs events status

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**From Black Hole to Extended Visibility:
Large Apparel Firm launches SCV platform, gains Control**

Levi Strauss & Co. uses a best-of-breed supply chain visibility platform to provide a software solution to handle their inbound logistics for the US. The solution had to be flexible enough to fit seamlessly into a cross-country, global style supply chain infrastructure and robust enough to deal with the massive amounts of data generated by a company with a large number of product SKUs. The task of managing inbound for Levi Strauss & Co. is a complex one; involving interfacing with hundreds of trading partners moving products through a manufacturing and supply base in Asia, Middle East, Africa and Latin America. This is done largely by ocean and airfreight, from their major port hubs in Los Angeles, New Orleans, Miami, Charleston, Savannah and New York to their main distribution centers in Nevada, Mississippi, and Kentucky. "This solution gives us the visibility into our product as it travels through our extended supply line across the ocean and arrives at any one of our main ports and is transloaded inland by our 3PLs onto rail or truck on the way to each of our three distribution centers," explains Mishra. "But more than a track and trace, the system allows us to do pre-shipment scheduling and planning complete with milestones that we specify so that ETAs and shipment / inventory updates are dynamically updated," Mishra explained. "To do so, it was important that the platform handle Advance Ship Notice (ASN) and other EDI transactions. This was essential to our ability to transform from disconnected, manual processes to daily automation and exception management. When we launched the USA solution several years ago we went from a black hole (from Exit Factory up to receipt at the DC) to near-real time visibility and have integrated the solutions' reporting capabilities to gain tighter control over lead times," Mishra went on to say.

Levi Strauss & Co. leverages the reporting capability, manage by exception, and minimize supply chain risk. They can gather data on inbound cargo in near real time; allowing more time to make corrections and adjustments. An unexpected benefit comes from the software's use beyond simple reporting. "The data captured in the software allows us to perform lead time analysis and carrier management, which were impractical to perform manually," says Mishra. He went further in giving specific areas where the software has had a positive impact. "Because we had increased visibility into our inbound freight, it had a positive impact on the safety stock. We found that our lead times improved significantly, along with staff efficiency, lead time control, and improved safety. Versus an original ROI payback expectation of two years we can convincingly say that the benefits and intangibles have resulted in a payback in 18 months," stated Mishra.

continued

**From Black Hole to Extended Visibility:
Large Apparel Firm launches SCV platform, gains Control**

At the time of implementation, the system helped:

1. Estimated 98% reduction in manual tracking and tracing of inbound shipment
2. Estimated 80% reduction in phone calls/emails as the system provided "self-help" to internal users
3. The above helped in reducing FTEs in the inbound organization directly involved in track and trace, the remaining inbound team now has the increased bandwidth to pursue strategic and continuous improvement opportunities in the supply chain.

In the near term, Levi Strauss & Co. is looking to minimize the time needed to on-board new trading partners and get better at data integration. "The lack of information technology standardization among trading partners can be challenging. Currently we have a situation where some of our partners use EDI and other use a web interface and because of that the timing of the data and quality can vary," says Mishra.

In the long term, Levi Strauss & Co. is looking to employ more of a centralization strategy for its supply chain management with local execution, and a focus on high levels of inbound control, cost saving, visibility, and collaboration. "Currently, we are employing multiple systems to manage our supply chain. Our goal is to consolidate into fewer systems or integrate them all more seamlessly - eventually presenting just one system to our internal and external users. We know our outbound transportation is somebody else's inbound transportation - today the bulk of our outbound transportation is controlled by our retailers. All of this feeds into a primary objective, our company hopes to eventually control their own inbound - relying less on our contract manufactures, 3PLs and other service providers", concluded Mishra.

Competitive Assessment

Aberdeen Group analyzed the aggregated metrics of surveyed companies to determine whether their performance ranked as Best-in-Class, Industry Average, or Laggard. In addition to having common performance levels, each class also shared characteristics: (1) **process** (the approaches they take to execute daily operations); (2) **organization** (corporate focus and collaboration among stakeholders); (3) **knowledge management** (contextualizing data and exposing it to key stakeholders) along with **performance management** (the ability of the organization to measure its results to improve its business); (4) **technology** (the selection of the appropriate tools and the effective deployment of those tools). These characteristics (identified in Table 3) serve as a guideline for best practices, and correlate directly with Best-in-Class performance across the key metrics.

Table 3: The Competitive Framework

	Best-in-Class	Average	Laggards
Process	Online visibility into purchase order status		
	96%	68%	50%
	Online visibility into outbound in-transit shipment status		
	93%	62%	54%
	Online visibility into inbound in-transit shipment status		
	84%	61%	54%
	Lot-level or item-level product traceability		
	82%	59%	50%
	End-to-end supply chain milestone visibility		
	73%	50%	44%
Organizational	Centralized supply chain management organization		
	87%	76%	66%
	Cross-functional supply chain metrics		
	85%	63%	51%
	Formalized supply chain risk management		
	56%	43%	31%
	Online trading partner collaboration and enablement		
	69%	43%	37%
Knowledge / Performance Management	The ability to find (within reasonable time) and access inbound supply chain data needed for decision making		
	90%	51%	39%
	The ability to find (within reasonable time) and access outbound supply chain data needed for decision making		
	90%	50%	45%
Technology Enablers	Warehouse Management System (WMS)		
	84%	60%	46%
	Transportation carrier tracking system		
	82%	60%	37%
	Cargo / broker / carrier portal		
	67%	54%	36%
	Visibility system from an electronic messaging vendor (e.g., EDI / VAN)		
	76%	54%	51%
	Visibility system from a freight forwarder		
	55%	42%	35%
	Visibility system from a 3PL		
	58%	45%	33%

Source: Aberdeen Group, February 2011

"Our outbound transportation is somebody else's inbound transportation. All of this feeds into a primary objective, to eventually control our own inbound supply chain."

~ Director Inbound, Large Apparel Company

Capabilities and Enablers

Visibility is vast and spans a wide array of events. In the next section dedicated to the Best-in-Class processes we can further examine areas of focus to help companies evolve and bridge capability gaps. It is in the details that we begin to see separation, allowing us to identify "visibility blind spots" across the inbound and outbound supply chain.

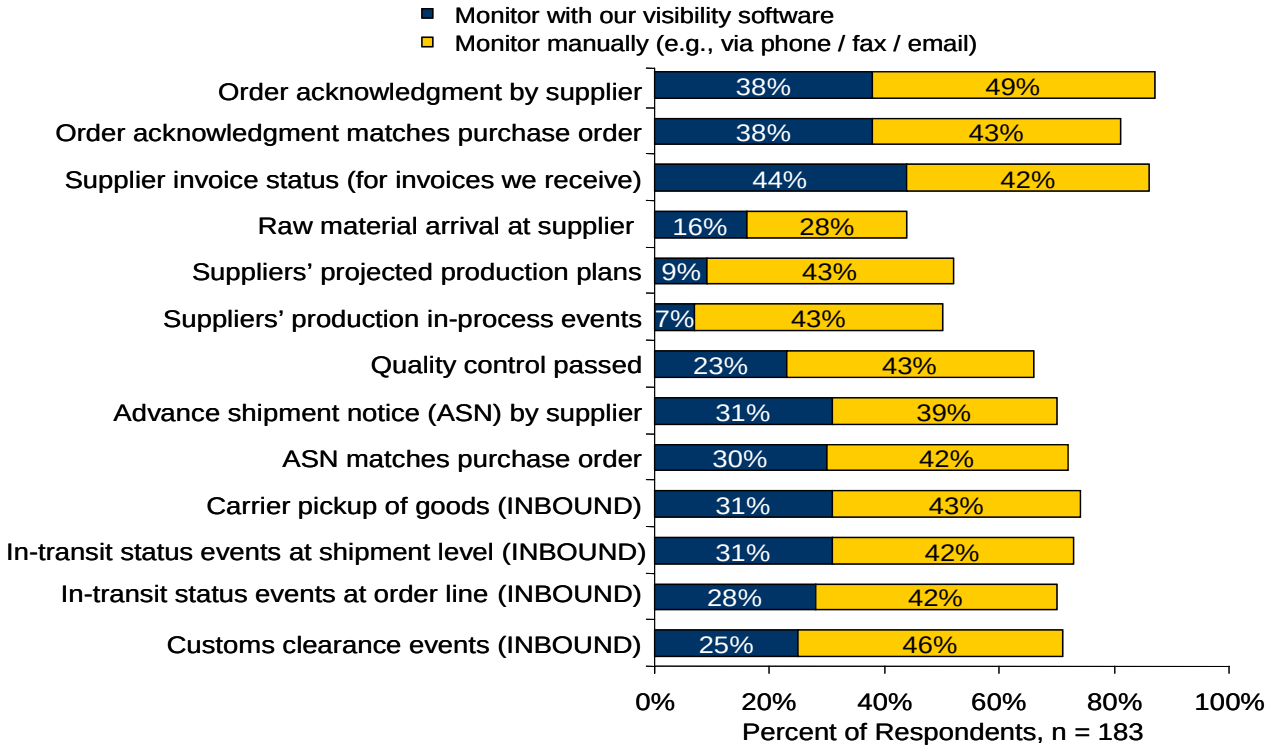
Process: Where Are the Top Visibility Gaps?

Figure 4 and Figure 5 show the current state of supply chain monitoring on the inbound and outbound sides. Findings show that, from a total of 21 categories of events examined in the survey, the top three least visible milestones (i.e. tracked either manually or automatically) in the supply chain are on the inbound.

Least Visibility

- √ Raw material arrival at supplier - tracked by 44% with 16% automated
- √ Suppliers' production in-process events - 50% with 7% automated
- √ Suppliers' projected production plans - 52% with 9% automated

Figure 4: Inbound / Supply Side Milestone Tracking



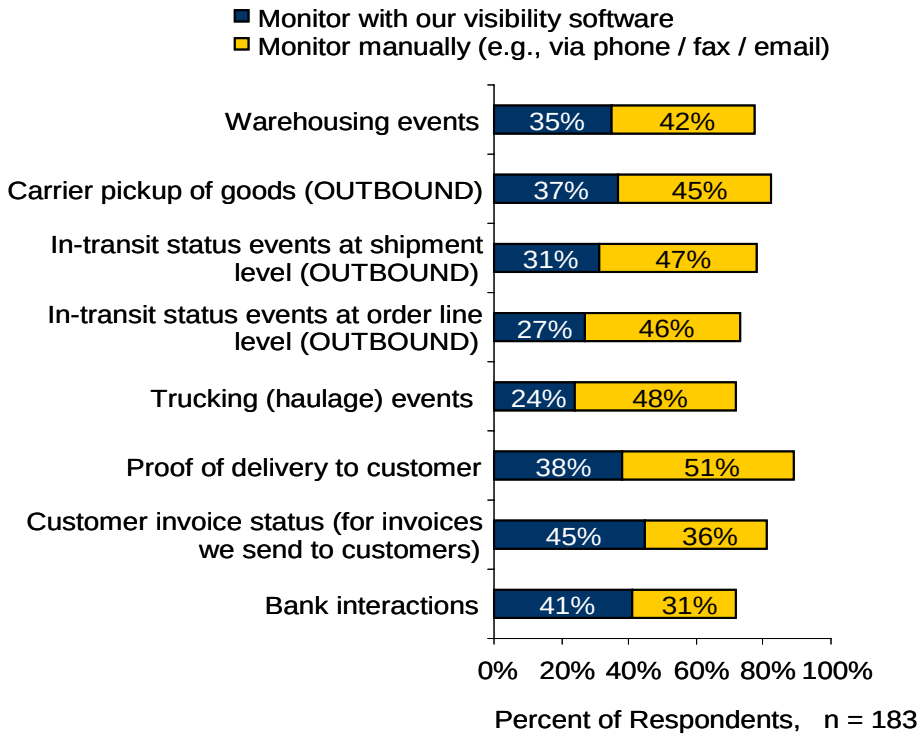
Source: Aberdeen Group, February 2011

Figure 4 shows the overall visibility capabilities of all companies in the typical sequence of event flow (i.e., inbound from order to receipt). The specific top inbound supply chain milestones in this sequence *where Best-in-Class performers are leading in monitoring* compared to all others are:

- Advance shipment notice (ASN) created by supplier - 1.45-times more likely to track than all others (94% of the Best-in-Class monitoring this milestone)

- Suppliers' projected production plans - 1.42-times more likely to track than all others (68% of the Best-in-Class monitoring this milestone)
- Customs clearance events (inbound) - 1.34-times more likely to track than all others (90% of the Best-in-Class monitoring this milestone)
- In-transit status events at order line level (inbound) - 1.34-times more likely to track than all others (87% of the Best-in-Class monitoring this milestone)

Figure 5: Outbound / Demand Side Milestone Tracking



Source: Aberdeen Group, February 2011

Figure 5 shows the overall visibility capabilities of all companies in the typical sequence of event flow outbound from shipment / pickup to proof of delivery and settlement. The specific top outbound supply chain milestones in this sequence where *Best-in-Class performers are leading in monitoring* compared to all others are:

- Trucking (haulage) events - 1.24-times more likely to track than all others (84% of the Best-in-Class monitoring this milestone)
- In-transit status events at order line level (outbound) - 1.20-times more likely to track than all others (84% of the Best-in-Class monitoring this milestone)

"We are bringing multiple containers in from abroad, so for us, supply chain visibility means knowing where things are while in transit. We are a low-margin high-volume business and have not historically invested much into supply chain systems. We are owned by a large company and mandated to use its systems for some, but not all, processes, which creates silos and makes it difficult to gain adequate visibility into our supply chain. We do not currently have integrated systems to provide the level of visibility that we need. Additionally, for our company there is still a lot to do on the supply chain process improvement side, so we are approaching this challenge from a process perspective first, before considering any technology enhancements. From a cultural perspective, many people within the organization are not yet aware of the improvements that could be made with better visibility, so there is strong resistance to change that will need to be overcome."

~ Medium-sized U.S. distributor

- Bank interactions - 1.19-times more likely to track than all others (83% of the Best-in-Class monitoring this milestone)

With 79% of study respondents indicating that they plan to increase their current level of end-to-end supply chain visibility, companies are now primarily trying to look further upstream into their supply chains to address those visibility 'blind spots.' Better upstream visibility then helps them improve supply chain planning and ultimately improve their own on time delivery to customers.

As leading companies like Walmart and Levi Strauss & Co. place renewed focus on their inbound supply chains, the above gaps in capability lead to superior results. These capabilities give the Best-in-Class a significant advantage in both planning / identifying inbound logistics opportunities, and reacting to the new pressures they face under tighter inventory levels. It is clear that these gaps in practice tie closely with superior results in both costs and service metrics - where the Best-in-Class delivered a 3% **reduction** in landed costs per unit compared to last year. In contrast, Laggards under similar pressures to reduce inventories and cost saw a 9% **increase** in landed cost. Also in contrast on the inbound side, Laggard companies obtained only 73% on-time and complete receipt from suppliers while Industry Average companies were at 87% and Best-in-Class at 96% respectively (Table 1).

Organization, Knowledge, and Performance Management are Linked

Year over year we see a trend toward centralized supply chain management organizations. The current year is no exception with at least 66% of companies (Laggards) and up to 87% of companies (Best-in-Class) currently structured under a centralized supply chain management organization (Table 2 and Figure 6). In our 2008 study *Beyond Visibility: Driving Supply Chain Responsiveness*, these levels were and 70% and 83% respectively.

As one refers back to Figure 1 and examines the multi-party, multi-tiered, multi-leg aspects of today's global supply chain, it is no surprise that companies are moving much more rapidly toward centralized control. Today's global company is faced with a growing number of contact and flow points across continents, countries, inbound and outbound flows, supply and demand interactions, multi-tier movements, and port and customs transition checkpoints.

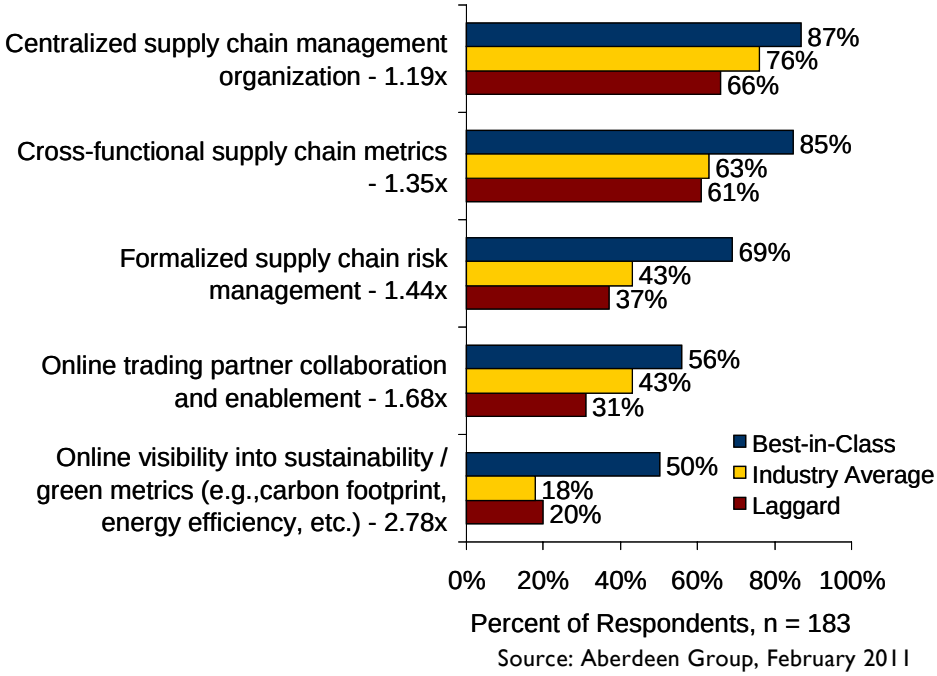
Tight centralized controls are necessary and companies of all classes have recognized this through levels of centralization where the Best-in-Class are 1.19 -times as likely as all others to structure their organizations centrally (Figure 6). A newer trend, however, is providing role-based visibility for internal and external partners; the gaps can be significant with the Best-in-Class almost twice as likely as all others to leverage role-based visibility within the organization and into external partners. This capability becomes critical in organizations that operate in a distributed networked

"Having supply chain visibility translates into being able to meet customers' needs. At this time, our best opportunities for improvement are on the inbound side, namely, in getting more visibility into our suppliers' production capacity. We have good visibility after the product has left a foreign port, but would like to have more insight into our suppliers' subcontractors and what is happening in their incoming supply chains. We believe that higher visibility is partly contributing to lower lead time variability, reduced inventory, shorter lead times, increased fill rates, and other supply chain operational improvements."

~ Director at a Medium-sized U.S. Durable Goods Firm

environment, with high levels of collaboration with customers, suppliers, and other stakeholders.

Figure 6: Organization and Collaborative Capabilities

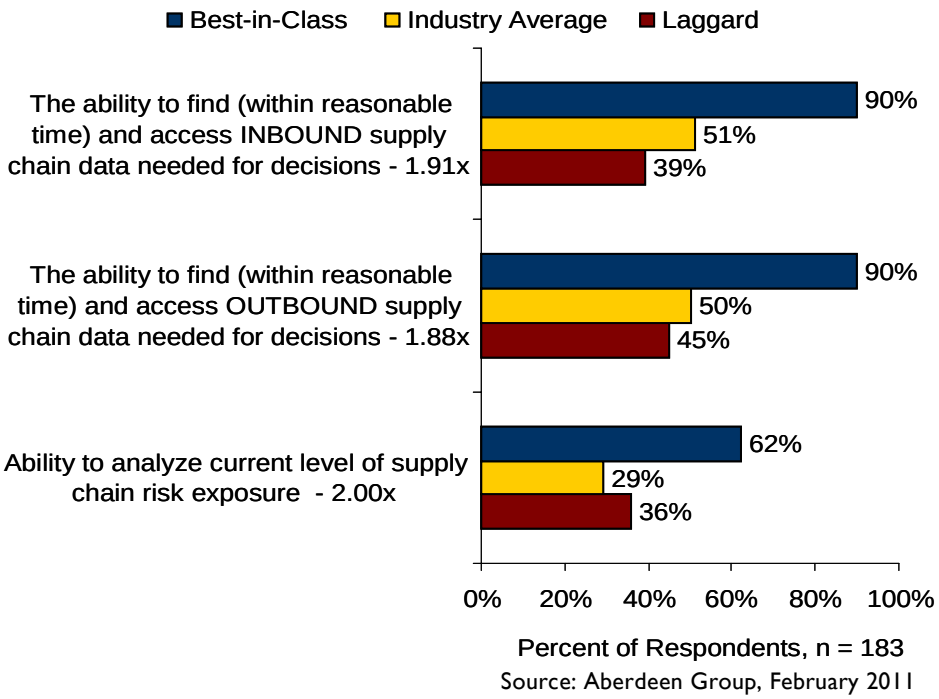


Source: Aberdeen Group, February 2011

As the supply chain becomes more collaborative is important that companies establish *cross-functional supply chain metrics*. The Best-in-class at 87% are 1.9 – times as likely as all others to have this capability they also are 1.7 - times as likely *to collaborate online with their trading partners*. And finally, they are much more likely to formalize 1) *supply chain risk management* and 2) *sustainability initiatives* within their organization.

The organizational structure of the company (and the manner in which it measures and encourages cross functional and role-based visibility) **is linked to the degree of excellence it exhibits in knowledge and performance management**. When it comes to decision-making Best-in-Class companies, at 90%, are between 1.8 to 1.9 - times as likely as all others to *find and access inbound and outbound supply chain data within a reasonable time* (Figure 7). Having improved access and informed intelligence to the inbound supply side and the outbound demand side of the extended supply chain is critical in today's global economy (and results in better operational performance as we've seen in prior sections). One result of superior visibility and intelligence is the capability to analyze and measure supply chain risk and exposure, and again the leading companies are two-times as likely as all others to have this capability.

Figure 7: Knowledge and Performance Capabilities



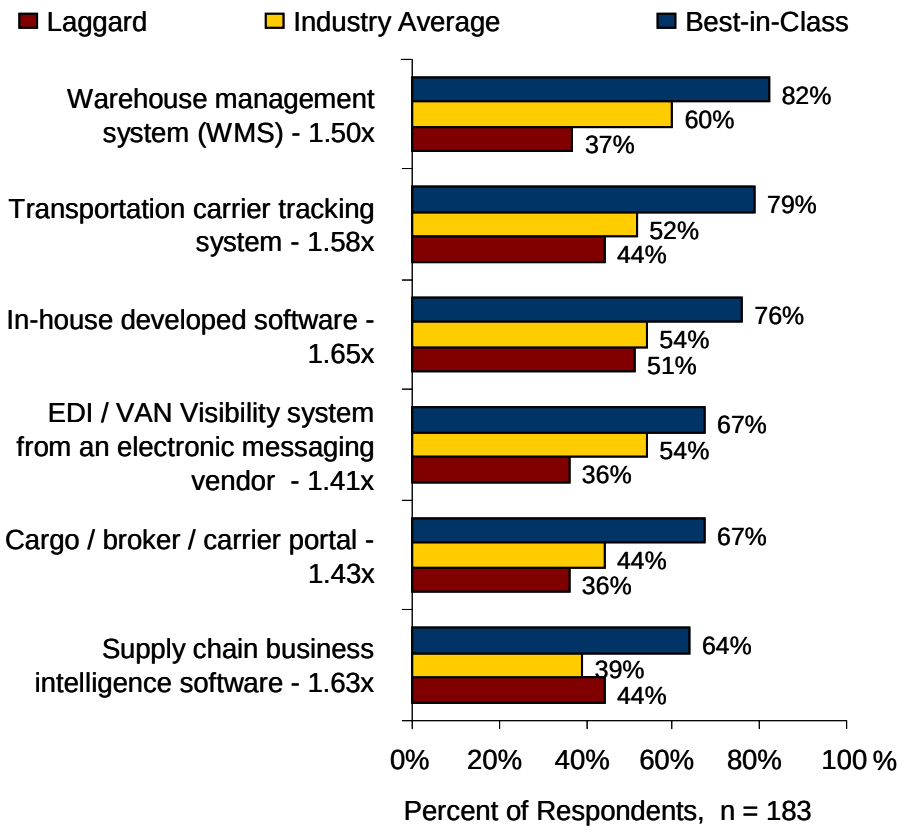
Source: Aberdeen Group, February 2011

Technology Enablers and ROI Performance Levels

In the area of supply chain visibility there are many different technologies available to deploy. In addition to home grown or legacy systems, there are ERP and supply chain management suites, commercial point solutions, solutions from logistics services providers (3PLs, Freight Forwarders), trading partner platforms / services, etc., in both hosted and / or SaaS models.

Many companies still rely on mail / phone / fax for monitoring many of the supply chain events or in some cases do not monitor some of the events at all (see Figure 4 and Figure 5 where the non-automated range gold bars averages 42%). But for events that are tracked automatically, the blue bars which range from an average of 30% to a high of 45%, this report summarizes the various levels of adoption of automated solutions and compares top performing companies with Industry Average and Laggard. The components listed in the Competitive Framework in Table 3 under "Technology" represent those for which the largest gaps exist between the Best-in-Class and all others. Also Figure 8 gives a graphic depiction of current adoption levels from highest to lowest along with technology gaps. From this we can see that the Best-in-Class are anywhere from 1.4 to 1.65 - times as likely to automate using each solution.

Figure 8: Key Technology Differentiators of Best Performers



Source: Aberdeen Group, February 2011

Investments in supply chain technology have both tactical and strategic implications. The technology will determine how rapidly relevant data from the company's own internal enterprise system (or to the data and events from the much broader multi-party supply chain) can be shared. It will also determine how much time supply chain members and partners/customers spend on monitoring and managing transactions between one another.

Warehouse and Transportation Management Systems - Key Components and Differentiators

Warehousing and transportation systems, the anchor elements of logistics software, are the most commonly utilized components and tend to be the glue that holds together the discrete elements of the various platforms within the enterprise. Even though ERP systems and SCM suites provide multiple modules to include order management, warehousing and distribution, inventory management, customer service and finance, it is the Transportation or Warehouse Management Systems (TMS / WMS) that are often the most mature and interconnected to the others.

Technology Investment Plans and Relative ROI Guidelines

When it comes to bringing together best-practices in process improvements with the technology available in the market today, investment in the software utilized for supply chain visibility (ranging from SCV/TMS/WMS or BI software, auto-ID, and material/cargo tracking equipment) has largely matured and is poised to match business need in virtually every aspect of Supply Chain Visibility. With the exception of cargo security and GPS (which are just now emerging as newer options for all companies to explore), the larger need for companies in each class is properly selecting from all the options that are competing for the company's continuous improvement dollar as they invest in new or enhanced technologies.

We asked the respondents which were planning investments in one or more technology areas to indicate their interest in investment / improvement (by technology type). Out of 183 respondents, 130 have some interest in options ranging from software, equipment, logistics service providers, or 3PLs to help them upgrade their current capabilities or to process portions of their volume. The real challenge in selection is aligning the right technology/solution to each operations specific need or operating profile and then sorting through a cost/benefit analysis for all the competing options. The following table is a decision matrix to assist in evaluating the cost /benefit and ROI factors from our survey responses.

Table 4: Technological Investment Hurdles and ROI Guidelines

Expected ROI	All	SC BI & Tools	3PL / LSP	Supplier/ Carrier Portal	Event Track	TMS WMS	EDI VAN	SCV	ERP	AVL, GPS & Security
Percent of Companies Planning		*78%*	*75%*	*68%*	*62%*	*54%*	*53%*	*48%*	*48%*	*43%*
0 - 6 months	9	7	6	7	4	7	6	8	6	3
7 - 12 months	31	23	24	21	22	13	13	17	10	14
13 - 18 months	37	31	28	27	25	21	20	17	20	12
19 months - 2 years	21	16	17	14	13	11	12	9	13	10
2 - 3 years	11	7	8	8	7	7	6	6	3	4
3 - 5 years	15	13	13	10	8	10	9	5	7	11
More than 5 years	6	4	1	3	0	0	3	1	4	3
Total Companies	**130**	**102**	**97**	**89**	**80**	**70**	**69**	**63**	**62**	**56**
Months to ROI….	*20.5*	*20.6*	*20.0*	*19.7*	*18.4*	*19.9*	*20.8*	*17.8*	*21.1*	*23.3*
Percent expecting less than 1 year ROI	*31%*	*30%*	*30%*	*31%*	*33%*	*29%*	*28%*	*39%*	*25%*	*29%*

Source: Aberdeen Group, February 2011

Note: While only a few companies in the study have internal ROI financial paybacks set at beyond five years this does not imply that years of usage is less than five years. In many instances these solutions have been in place at these companies for seven to 10 years and more. For GPS and equipment, the depreciation schedules themselves are seven years or more but for most the payback is still two years or less.

Across the top of the matrix are the various technology types ranging from *Supply Chain BI and Tools* at 78% of the investment responses, or 102 interested companies, and ending in *Automated Vehicle Tracking / GPS and Security* at 43% of the responses (56 companies). In the middle section of the matrix are the ROI required financial payback hurdles mandated for each solution type and company. Overall there is an average ROI expectation of 20.5 months to payback. Some of the companies are targeting paybacks in less than one year and the percent of companies with that expectation is in the last row. From the ROI matrix we can observe several key points:

- The popularity of a given investment choice is ranked from left to right and the first four items up through *Event Tracking* are in the 60% plus range. SC BI has very high adoption rates currently (78%) and is outranked only by the anchor logistics WMS and TMS (where 82% and 79% of the Best-in-Class have already invested, as shown in Figure 8).
- The first four choices also represent choices that typically tend to be tools that operate well in cross-company integrations and, hence, are areas of investment where benefits beyond the enterprise and into the supply base can yield significant benefits (perhaps even self-funding) within one year. In fact 30% to 33% of companies expect these solutions to generate a payback of less than one year - perhaps this is why they are the most popular investment choices.
- The second choice, 3PLs or logistics service providers (75%), is a growing option to outsource capability and business process, or to offer extended capabilities that a company does not have in-house. For an idea of the current levels of adoption of this solution more details are provided in the sidebar.
- The next four choices, starting with WMS /TMS (which we talked about as anchor differentiators) and ending with modules of an ERP, are all in the 48% to 53% level of popularity. These options tend to involve larger capital outlays and can extend up to, or beyond, a 19 month ROI payback hurdle. In the category SCV or commercial supply chain visibility the average payback is lowest of all investment choices, 17.8 months, and the number of projects paying back in one year is the highest (39%). It was this type of solution that was highlighted in the Case Study.
- The final choice, coming in at 43%, is security and cargo and vehicle tracking solutions like GPS, RFID, and so on. While there is a steeper investment required to justify these solutions they are becoming more economical and are vital with pharmaceutical, defense, and controlled or regulated shipments. The recent surge in terrorism, theft and counterfeiting is spurring new interest.

Current Software Usage All

- √ **75**% -BI tools for critical aspects of SCV analysis
- √ **62**% -Warehouse Management System (WMS)
- √ **59**% -Module in our ERP system
- √ **58**% -Transportation carrier tracking system or portal
- √ **57**% - EDI / VAN visibility system from an electronic hub
- √ **54**% - In-house developed software
- √ **46**% -Commercial visibility system

Outsourced Services:

- √ **17**% to **22**% off all companies seek to expand outsourced services for logistics

Beyond these levels:

- √ **29**% to **40**% of all companies currently utilize outsourced or managed services for components of their warehouse management
- √ **29**% to **41**% of all companies currently outsource to more than one 3PL or logistics service providers for components of their warehousing or logistics

Aberdeen Insights — Technology

Across the board, there are still a majority of companies that are non-automated or manual in the events they monitor (Figure 4 and Figure 5). These events largely extend beyond the enterprise and highlight the degree of interconnected visibility required for today's end-to-end supply chain. Numerous event and product flows - on inbound and outbound, SKU, container, order, lot and package level - across dimensions of both cost and service are being monitored across the full supplier base. It is important that a standardized and structured system roadmap is developed to integrate these system events and data flows as companies bring online new capabilities and new event tracking.

A company's technology infrastructure can be a predictor of its current state of connectivity and visibility and the degree of true analytics and supply chain intelligence it can purvey. Broadly speaking, companies with shared, centralized, and more fully integrated information systems tend to be more successful in their connectivity and visibility improvement initiatives. In a global company with multiple disparate systems and hardware / software configurations, it means that more time and money is required to test and implement and eventually integrate new supply chain application software, update existing software, and deploy the latest security patches to the installed systems.

These factors, the complexity of today's global supply chains, and a surge in the numbers of trading partners make real connectivity more difficult to achieve. Companies need to develop roadmaps for integration that account for the increased need for visibility to more granular levels. Also, developing roadmaps can assist with data integrity, data sharing and bi-directional synchronization issues. To succeed in today's distributed demand-supply networks, it is important that companies connect to their business partners and analyze the information at hand to reengineer how they integrate and operate - only then can they emerge stronger, more secure, resilient and efficient.

Chapter Three: Required Actions

Whether a company is trying to move its performance in from Laggard to Industry Average, or Industry Average to Best-in-Class, the following actions will help spur the necessary performance improvements:

Laggard Steps to Success

- **Start with your inbound, the low hanging fruit**. There are rich rewards for the companies that can proactively transform inbound. The Laggard company is anywhere from 70% to 240% less likely than the Best-in-Class to automate their inbound events. Getting earlier visibility into which purchase orders are included in the current shipment could help in planning customer delivery issues. Once all of the expected orders have been shipped with fewer delays, then the leadtime advantages of the top performers (see sidebar) can be in reach.
- **Focus on developing logistics resiliency.** In order to achieve quicker response times to unexpected shipment or logistics disruptions, companies need to increase the agility of their global supply chains. Currently only 19% of Laggard companies have *online visibility into the customs events status* vs. 62% for the Best-in-Class. Getting advanced visibility could help avoid penalties and delays at the port and can reduce their lead-times and inventory. This was a major benefit in the Case Study.

Industry Average Steps to Success

- **Examine supply chain business intelligence software.** Currently only 39% of Industry Average companies have this software vs. 62% for the Best-in-Class and 44% for Laggards. There is rich functionality in today's Best-of-Breed SVC solutions and this category has the quickest overall payback (17.8 months) with 39% of companies expecting the benefits to fund the costs within one year.
- **Champion process / visibility into sustainability / green metrics**. Currently only 18% of Industry Average companies have online visibility into these metrics vs. 50% for the Best-in-Class and 20% for Laggards. There are savings with green initiatives - transportation costs can be lowered (via reduction of empty miles) which can reduce fuel consumption. Today's best-of-breed companies like Walmart are embracing these types of capabilities.

Best-in-Class Steps to Success

- **Automate Advance Shipment Notice (ASN) created by the supplier.** Currently only 38% of the Best-in-Class have this software. Inbound or outbound ASNs are established EDI

Percent of Lead-time Days Best-in-Class vs. Others

- √ **67**% - Fewer days domestic outbound (shipping)
- √ **55**% - Fewer days international outbound (shipping))
- √ **52**% - Fewer days domestic inbound (receiving)
- √ **43**% - Fewer days international inbound (receiving)

"Our continued improvements in supply chain visibility will help us do a better job of maintaining high in stock performance for our customers while effectively managing inventory levels."

~ VP Supply Chain, Large Distributor

transactions and there is functionality that can be leveraged from a variety of platforms, both hosted and SaaS. There are also EDI hubs and other solutions/services available through an LSP or 3PL. There is really no reason for not automating this transaction.

- **Justify additional investments to improve visibility or informed decision making**. The Best-in-Class are anywhere from 1.6-times to 2.0-times ahead of their peers in the adoption of most of the technology categories found in Table 4. But with levels of manual process equal to or greater than automated levels (see Figure 4 and Figure 5) there is more benefit to derive. Even the most invested can enhance or build out their capability in the quest to bolster supply chain performance and foster security, reliability and efficiency across their end-to-end supply chain. There are double digit performance gains available to the diligent.

Aberdeen Insights — Summary

As the degree of global collaboration grows, and global supply chains become even more complex, it is likely that visibility systems will continue to be a collection of discrete systems. The graphic illustration found in Figure 1 gives evidence to the growing complexity and multi-tiered nature of today's supply chain.

As illustrated by our research, Best-in-Class companies are most successful in integrating their people, process and technology and are gaining a more end-to-end and close-to-real-time visibility of their supply chain operations and across the multi-tier supplier base. This report explores the capabilities that Best-in-Class companies are deploying and strategic alliances they are using to capture, integrate and optimize the myriad of supply chain events within their overall global enterprise and through their trading partners.

The ultimate objective is to achieve what we term agile and adaptive supply chain execution. Visibility is one step but the objective doesn't stop there, it goes beyond the tactical ability to see the flow of materials and finished products to include a strategic business transformation component that ties into the strategic business objectives. Drawing on the best practice, we recommend that companies move toward a more connected and visible supply chain through the following three-phase approach:

- Extending visibility within and beyond their enterprise
- Utilizing dynamic business intelligence and decision making
- Moving to security, resiliency, and efficiency in supply chain execution

As companies return to expansion following the economic downturn it will be up to supply chain executives to continue on the journey of adapting to change with each new challenge.

Appendix A: Research Methodology

Between January and February 2011, Aberdeen examined the use, the experiences, and the intentions of more than 183 enterprises on the topic of Supply Chain Visibility.

Aberdeen supplemented this online survey effort with interviews with select survey respondents, gathering additional information on Supply Chain Visibility strategies, experiences, and results.

Responding enterprises included the following:

- *Job title:* The research sample included respondents with the following job titles: Manager (27%); Director (22%); C-level (13%); EVP / SVP / VP (10%); Consultant (12%); General Manager / Managing Director (7%) and other (9%).
- *Department / function:* The research sample included respondents from the following departments or functions: procurement, supply chain, or logistics manager (56%); IT manager or staff (13%); sales and marketing staff (11%); and senior management (10%); operations manager (5%) and other (5%).
- *Industry:* The research sample included respondents from: Food and Beverage (11%); Industrial Manufacturing (9%); Retail and Apparel (9%); Transportation and Logistics (8%); Government, Aerospace and Defense (8%); Consumer Packaged Goods (CPG) (8%); Wholesale Distribution (6%); Computer Equipment (4%); Health and Medical (3%); and Pharmaceutical Manufacturing (2%).
- *Geography:* The majority of respondents (58%) were from North America. Remaining respondents were from Europe (19%), Asia-Pacific (16%), Middle East (5%) and South America (2%).
- *Company size:* Forty-six percent (46%) of respondents were from large enterprises (annual revenues above US $1 billion); 30% were from midsize enterprises (annual revenues between $50 million and $1 billion); and 24% of respondents were from small businesses (annual revenues of $50 million or less).
- *Headcount:* Sixty percent (60%) of respondents were from large enterprises (headcount greater than 1,000 employees); 25% were from midsize enterprises (headcount between 100 and 999 employees); and 15% of respondents were from small businesses (headcount between 1 and 99 employees).

Study Focus

This report focuses on the logistics network as the core component of the integrated demand-supply networks outlined in Aberdeen's earlier studies. It investigated the role played by supply chain visibility in enabling supply chain operational excellence and improving supply chain performance.

The study aimed to identify emerging best practices for Supply Chain Visibility, and to provide a framework by which readers could assess their own:

- √ Management and process capabilities
- √ The benefits, if any, that have been derived
- √ Technological investment choices relative to their peers
- √ ROI payback expectations and self funding options

Table 5: The PACE Framework Key

Overview
Aberdeen applies a methodology to benchmark research that evaluates the business pressures, actions, capabilities, and enablers (PACE) that indicate corporate behavior in specific business processes. These terms are defined as follows: **Pressures —** external forces that impact an organization's market position, competitiveness, or business operations (e.g., economic, political and regulatory, technology, changing customer preferences, competitive) **Actions —** the strategic approaches that an organization takes in response to industry pressures (e.g., align the corporate business model to leverage industry opportunities, such as product / service strategy, target markets, financial strategy, go-to-market, and sales strategy) **Capabilities —** the business process competencies required to execute corporate strategy (e.g., skilled people, brand, market positioning, viable products / services, ecosystem partners, financing) **Enablers —** the key functionality of technology solutions required to support the organization's enabling business practices (e.g., development platform, applications, network connectivity, user interface, training and support, partner interfaces, data cleansing, and management)

Source: Aberdeen Group, February 2011

Table 6: The Competitive Framework Key

Overview	
The Aberdeen Competitive Framework defines enterprises as falling into one of the following three levels of practices and performance: **Best-in-Class (20%) —** Practices that are the best currently being employed and are significantly superior to the Industry Average, and result in the top industry performance. **Industry Average (50%) —** Practices that represent the average or norm, and result in average industry performance. **Laggards (30%) —** Practices that are significantly behind the average of the industry, and result in below average performance.	In the following categories: **Process —** What is the scope of process standardization? What is the efficiency and effectiveness of this process? **Organization —** How is your company currently organized to manage and optimize this particular process? **Knowledge —** What visibility do you have into key data and intelligence required to manage this process? **Technology —** What level of automation have you used to support this process? How is this automation integrated and aligned? **Performance —** What do you measure? How frequently? What's your actual performance?

Source: Aberdeen Group, February 2011

Table 7: The Relationship Between PACE and the Competitive Framework

PACE and the Competitive Framework – How They Interact
Aberdeen research indicates that companies that identify the most influential pressures and take the most transformational and effective actions are most likely to achieve superior performance. The level of competitive performance that a company achieves is strongly determined by the PACE choices that they make and how well they execute those decisions.

Source: Aberdeen Group, February 2011

Appendix B:
Related Aberdeen Research

Related Aberdeen research that forms a companion or reference to this report includes:

- *Warehouse Management Excellence: Maximizing Resources and Efficiency,* November 2010
- *International Transportation: Optimize Cost and Service in a Global Market*; July 2010
- *Labor Management: Instill Accuracy, Efficiency, and Productivity in the Warehouse and Retail Store;,* March 2010
- *State of Retail Logistics: Strengthening Cross-Channel Supply Chain Execution,* March 2010
- *Supply Chain Visibility Excellence: Reduce Pipeline Inventory and Landed Cost*; December, 2009
- *On-Time and Under Budget: Maximizing Profits with Efficient Warehouse Management,* December 2009
- *Multi-enterprise Manufacturing: The Role of Visibility and Collaboration in Driving Responsiveness;* July 2009
- *Integrated Demand-Supply Networks: Five Steps to Gaining Visibility and Control;* March 2009
- *Five Key Steps to Optimizing Warehouse Management;* February 2009
- *Beyond Visibility: Driving Supply Chain Responsiveness*; September, 2008

Information on these and any other Aberdeen publications can be found at www.aberdeen.com.

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