



Executive Summary

The Automotive, Aerospace and (to a lesser extent) Defense industries are undergoing massive globalization. They are in various stages of transformation from a regional/local model to a global model in which the buying, making, moving, and selling activities could happen anywhere in the world. To thrive in today's globalized environment, AA&D companies are reexamining their supply chain processes and their supporting technology.

In Search of Supply Chain Improvements

Aberdeen benchmark results show that supply chain management processes and technologies are being actively re-evaluated by AA&D industry companies today. Fully 76% of companies have delivered to or been asked to deliver to management recommendations on how to improve their supply chain management technology in the past six months. And 79% of companies are looking to improve their supply chain management processes

Struggling with Incomplete Supply Chain Management Automation

Aberdeen research finds that 76% of the companies surveyed do not have full supply chain process automation and a common system company-wide. Only 24% of companies have supply chain processes that are fully automated with either different systems or common systems across their company.

Best in Class companies are:

- 3X less likely to have manual or spreadsheet intensive supply chain processes
- 2X more likely to have standardized on a common, company-wide supply chain platform

Spending Plans

Overall, 85% of companies surveyed plan to spend some money in 2007 for supply chain technology initiatives. Fully 73% of companies with revenue of over USD\$1 billion plan to spend more than \$250,000 in 2007 for new supply chain technology projects.

Partnering with Packaged Software Vendors for Innovation

Nearly three out of 10 AA&D companies are seeking to partner with their ERP vendor or best of breed supply chain vendor to create **net new** innovations for supply chain. This compares to 19% that are looking to create innovations through custom-developed or in-house development. The rest of respondents are looking to catch up to the industry average or adopt already established best practices for supply chain.

Recommendations for Action

Given the nature of complex business requirements within the automotive, aerospace and defense industries, companies should investigate enterprise applications that are flexible



Globalization: A Turning Point for Packaged Supply Chain Applications

enough to adapt to different company business requirements through usage of Service Oriented Architecture. Master Data Management should also be looked at carefully. These innovations are making packaged application-based supply chain platforms a viable path for AA&D companies.

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Chapter One: Issue at Hand

Key Takeaways

- The Automotive, Aerospace, and Defense (AA&D) industries are undergoing massive globalization resulting in a renewed focus on supply chain improvement.
- AA&D companies are feeling continued pressure to lower supply chain costs and reduce order-to-delivery lead times to be more competitive.
- 76% of AA&D companies have not automated their supply chain processes fully across their company.

The Automotive, Aerospace and (to a lesser extent) Defense industries are undergoing massive globalization. They are in various stages of transformation from a regional/local model to a global model in which the buying, making, moving, and selling activities could happen anywhere in the world.

The transformation to a global model is creating new supply chain challenges internally within Automotive, Aerospace and Defense (AA&D) companies and in their systems suppliers and tier suppliers. This transformation is being done to achieve greater scale and cost efficiencies while maintaining or enhancing supply chain flexibility and customer responsiveness. For instance, more and more supply chains are starting to originate in low-cost sourcing countries such as Asia (e.g., China and India) and Eastern Europe.

In fact, due to globalization, each tier in the automotive supply chain, for instance, can now be in any part of the world. This is resulting in new supply chain dynamics such as original equipment manufacturers (OEMs) being challenged to manage a global footprint of production and **suppliers increasingly focused on new customer acquisition** rather than being captive to one or two OEMs, resulting in a need for improved customer service and supply chain competency.

Benchmarking the AA&D Industries

To understand AA&D technology adoption trends and benefits, Aberdeen benchmarked 105 automotive, aerospace and defense companies in December 2006 – January 2007 through a dedicated survey. This survey was supplemented with phone interviews. The survey participants included OEMs, tier suppliers, and distributors, many of which are involved in both the automotive and A&D industries. Refer to Appendix B for more detailed demographics of the participants.

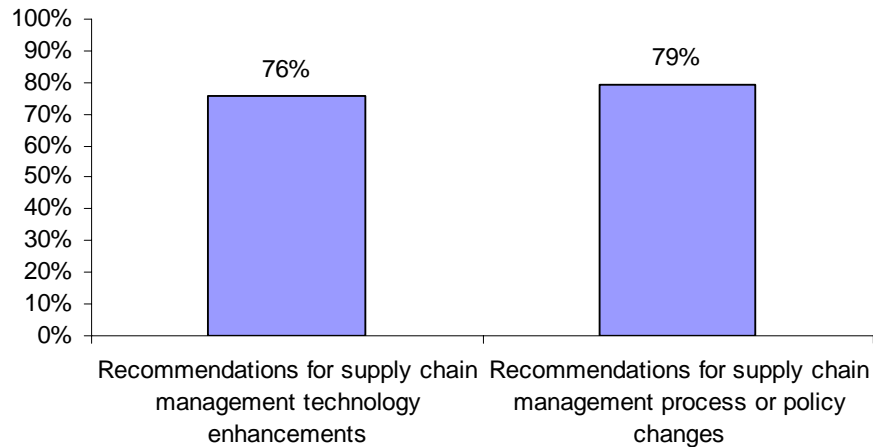
In Search of Supply Chain Improvements

To thrive in today's globalized environment, AA&D companies are reexamining their supply chain processes and their supporting technology. Aberdeen benchmark results show that supply chain management processes and technologies are being actively re-evaluated by AA&D industry companies today. Fully 76% of companies have delivered to or been asked to deliver to management recommendations on how to improve their



supply chain management *technology* in the past six months. And 79% of companies are looking to improve their supply chain management *processes* (Figure 1).

Figure 1. AA&D Management: In Search of Supply Chain Improvement



Source: [AberdeenGroup](#), January 2007

Additional pressures for supply chain improvement include a major focus on rapid new product development programs due to competition from global brands as well as shifts in consumer taste (e.g., vehicles with better gas mileage or Boeing 787 program). The automotive industry is feeling continued pressure to improve order-to-delivery lead times to customers and dealers and better match supply to short-term demand.

Aerospace and defense companies are feeling continued compliance initiative pressure, resulting in a need for more technology enablement of business processes. For instance, there is a split need in the aerospace and defense sector for commercial and military supply, which can often come from the same suppliers but need to be tracked separately because of the military's higher levels of quality and different compliance and documentation requirements.

Other initiatives creating a heightened focus on supply chain management technologies and processes include expanding Lean and 6 Sigma initiatives that are stretching into the supply chain. New supply chain finance opportunities to lower sourcing costs and extend payment terms while helping suppliers improve cash flow and gain earlier access to capital are also being examined by many companies.

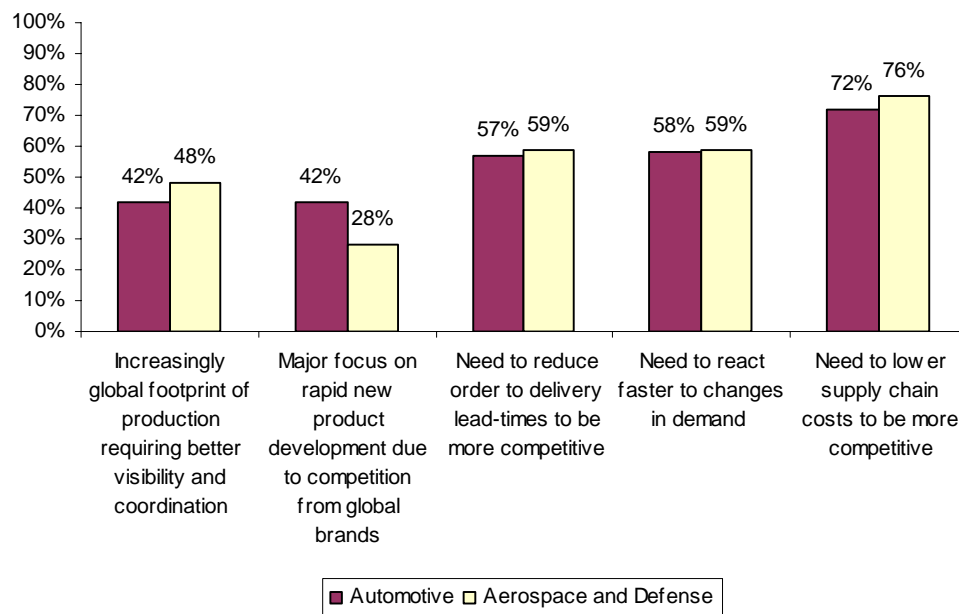
Costs and Lead Times Are Top of Mind

As Figure 2 shows, the top reason that AA&D companies are rethinking their supply chain management practices is because they are being pressured to lower supply chain costs to be more competitive (these are respondents who have indicated these pressures are 'very influential'). AA&D companies showed almost identical percentages for their pressures, with just a few exceptions:



- Among automotive OEMs, the top pressure, cited by 80%, is the need to reduce order to delivery lead times.
- Aerospace and defense companies were slightly more likely to feel pressured by the increasingly global footprint of production (48% of A&D vs. 42% automotive)
- About 42% of automotive companies said that rapid new product development was a very influential pressure compared with 28% of aerospace and defense companies.

Figure 2. Top Pressures for Improving Supply Chain Management Processes



Source: AberdeenGroup, January 2007

AA&D Companies Focus on Supply Chain Improvement

- Improving our sales and operations planning (S&OP) process and overall procurement costs is our top supply chain management priority – *Director of Supply Chain at a Large Aerospace and Defense OE manufacturer*
- Our top supply chain management priority is to reach into global opportunities for not only the supply chain ... but also to increase our presence closer to the emerging customer – *Supply Chain Manager at a Large Aerospace & Defense OEM*
- Our top supply chain management priority is to enable better inter-tier communication and coordination – *In-house Supply Chain Analyst at a large Automotive OEM*
- RFID, in-transit visibility, and better stewardship of Government property is our top supply chain priority – *Director of Logistics/Supply Chain at a large Defense Logistics Service Provider/3PL*

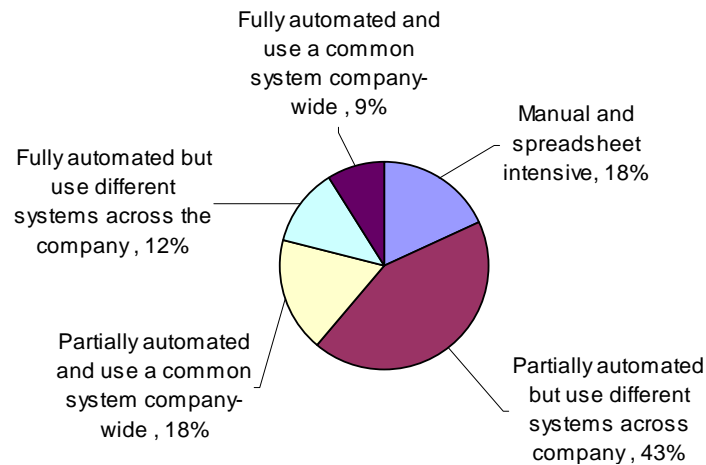


- Our top supply chain management priority is to accomplish the delivery times without adding more resources and costs – *In-house Supply Chain Analyst at a Mid-size Automotive Tier Supplier*

Struggling with Incomplete Supply Chain Management Automation

Figure 3 shows the supply chain automation level of the AA&D survey participants. Aberdeen research finds that 76% of the companies surveyed do not have full supply chain process automation and a common system company-wide. Only 24% of companies have supply chain processes that are fully automated with either different systems or common systems across their company.

Figure 3. Degree of Supply Chain Process Automation for AA&D Companies



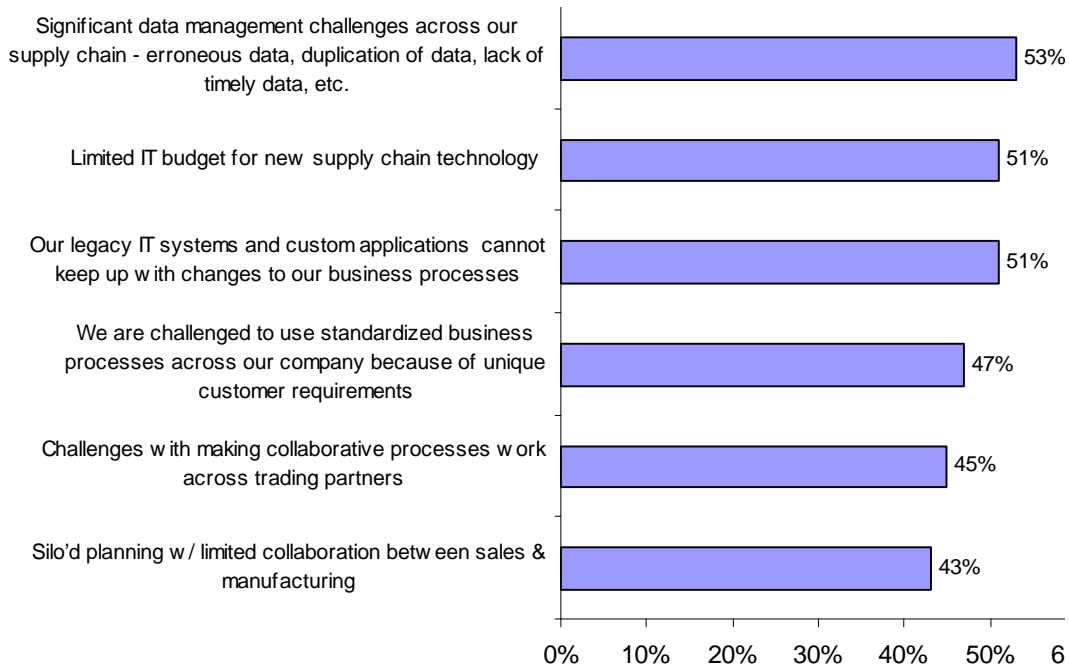
Source: AberdeenGroup, January 2007

Data management and IT system inadequacies top the reasons that AA&D companies say they are struggling to improve supply chain management performance (Figure 4). Half of companies report that one of their performance challenges is that their legacy IT systems and custom-built applications cannot keep up with their changing business processes.

AA&D companies are realizing the need to move toward a lower cost, more flexible supply chain technology infrastructure. Many companies are now moving toward deploying practical packaged applications that are tailored to AA&D supply chains. Given the limited IT budgets that companies have for new supply chain technology, it is also essential to look into high ROI areas when making supply chain technology investments. Companies' technology investment priorities are discussed in Chapter 2.



Figure 4. Top Challenges for Improving Supply Chain Performance



Source: AberdeenGroup, January 2007

- “Our internal order management system was built 40 years ago,” reports a program manager for a multi-year supply chain transformation project at a large industrial equipment manufacturer. “The system still is literally un-replaceable due to several critical functions that are not available in packaged applications.
 “But we are committed to work with our solution partners [includes both an ERP vendor as well as a best of breed end to end supply chain vendor] to transform our supply chain to be best in class,” he continues. “With globalization driving major construction activity, we are getting a lot of orders from all over the world and are growing rapidly. Our existing legacy systems cannot scale in this environment.”
- “We mainly want to minimize supply chain cycle time from order processing up to fabrication and assembly process,” says an in-house analyst in an aerospace and defense OEM. “We need a flexible technology system that could provide a tailored solution based on each project.”



Chapter Two: Key Business Value Findings:

Key Takeaways

- Best in Class Automotive OEMs are 1.5X more likely to be focused on how to react faster to changes in demand versus their peers.
- Best in Class Aerospace OEMs are 1.3X more likely to be focused on volume and program planning initiatives.
- Best in Class Tier suppliers are 2X more likely to be focused on implementing multiple replenishment models (Kanban, min/max replenishment, purchase orders).

As part of the Aberdeen benchmark analysis, Best in Class AA&D companies were identified for three sectors:

- Best in Class automotive OEMs were the top 20% of companies with the lowest average finished goods inventory levels and the lowest supply chain costs as a percentage of sales revenue.
- Best in Class aerospace OEMs were the top 20% of companies with the lowest supply chain costs as a percentage of sales revenue.
- Best in Class tier suppliers for AA&D were the top 20% of companies with the lowest inventory levels.

What Best in Class Performers Do Differently

Best in Class AA&D companies are much more likely than their peers to have standardized on a common supply chain platform through ERP and supply chain software. Aberdeen defines the Best in Class as the top 20% of companies with the lowest average finished goods inventory levels, lowest order to delivery lead-times, and the lowest supply chain costs as a percentage of sales revenue.

- 3X less likely to have manual or spreadsheet intensive supply chain processes
- 2X more likely to have standardized on a common, company-wide supply chain platform

Following are some of the key differences in focus for Best in Class performers versus their lower-performing peers.

Best in Class Automotive OEMs

Best in Class automotive OEMs are:

- 1.5X more likely to be focused on how to react faster to changes in demand and reducing order to delivery lead times than their peers.
- More likely to be focusing on addressing data management issues across the supply chain whereas their lower-performing peers are still addressing challenges with their legacy IT systems and custom applications that cannot keep up with changes in business processes.



- 2 times more likely to be highly focused on order and inventory pipeline visibility
- 1.5 times more likely to be forecasting based on true customer demand
- 1.5 times more likely to be focusing on compressing product development timelines

Aerospace OEMs

Best in Class Aerospace OEMs are:

- 1.3 times more likely to be focused on supply-demand balancing (volume and program planning) initiatives than their lower-performing peers
- 1.5 times more likely to be focused on VMI/replenishment and supplier collaboration initiatives
- 3 times more likely to be focused on compressing product development timelines
- 2 times more likely to be focused on supply chain visibility initiatives

Tier Suppliers

Best in Class tier suppliers are:

- 1.5 times more likely to be focusing on volume and program planning initiatives. By comparison, their lower-performing peers are more likely to be focusing on manufacturing planning and scheduling initiatives. In many cases, Best in Class tier suppliers have already implemented advanced manufacturing systems and are now seeing to improve their longer-term planning capabilities.
- 2 times more likely to be looking for technology that supports multiple replenishment models (e.g., Kanban, min/max replenishment, and purchase orders) whereas their peers are likely to be focusing on electronic connectivity and EDI basics.
- More likely to be focusing on forecasting collaboration whereas their peers are likely to be focusing on order collaboration.

Packaged Applications Make Inroads in Automotive, Aerospace and Defense Supply Chains

An increasing number of success stories are emerging in which AA&D companies have implemented a packaged supply chain software solution. Below are a few examples of recent successes.

- A large North American automotive OEM has implemented a sequencing and scheduling solution using a commercial off-the-shelf solution from i2 Technologies for its 40 North American plants. This solution produces the assembly line sequences taking into consideration detailed production and marketing constraints. Some constraints that are considered are: paint blocking requirements, skip requirements, scatter requirements, higher priority for sales orders, etc.



- Volvo Construction Equipment has implemented a supply chain planning (SCP) suite from Synchron for their aftermarket service division. This has resulted in an increase in dealer service levels to 95% in under 6 months. The salient features of this solution are:
 - ✓ Ability to receive sales data directly from the dealers
 - ✓ SCP's forecasting engine then calculates forecasts, deploys and replenishes stock
 - ✓ The system allows the dealers to monitor the performance of the replenishment and send additional orders through an Global Order Management system provided by Synchron.
- The Boeing 787 program has implemented Exostar's Supply Chain Platform (SCP) solution, powered by E2open software, to provide end-to-end management of the order, inventory, and planning processes executed across multiple tiers of supply partners. Key elements of the solution deployed include:
 - ✓ Multi-tier order management – management of the complete order lifecycle from order issuance through invoice and payment across partner tiers
 - ✓ Reporting and analytics
 - ✓ Community management and support
 - ✓ Multi-tier demand/supply synchronization
 - ✓ Partner managed inventory
 - ✓ Security and Identity management
- A large tier 0.5 system supplier of interior systems for cars, light trucks and vans (seating systems, door systems etc) has implemented a factory planning system using QAD's ERP suite. Features of this solution include:
 - ✓ Planning and execution module to take OEM demand signals and convert to material requirements at the company's plants as well as downstream suppliers
 - ✓ Ability to create a JIT sequence for the system assemblies
 - ✓ Ability to support event driven messaging
 - ✓ Spreadsheet style graphical user interface
 - ✓ Support for min/max VMI/Kanban
- A mid-size tier (one and two) supplier of metal stampings, automated assemblies, lamination stampings and die castings has implemented an ERP system tailored for supply chain intensive manufacturing by CMS software. Features of this solution include:
 - ✓ Supports repetitive, flow and work order based manufacturing environments
 - ✓ Enables stringent on-time delivery and order accuracy requirements to be met
 - ✓ Supports real-time collaboration with suppliers and customers, who access a secure website to report shipment details or check order status.



- ✓ Supports integrated RF and bar code serialization to increase inventory accuracy

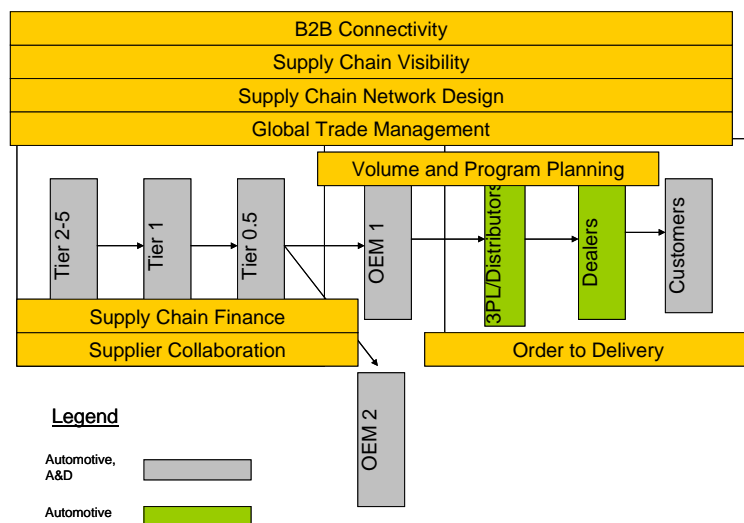
Survey respondents report a wide variety of technology projects driving improvement for them. Below are some of the responses when asked to name their most valuable recent supply chain automation initiative:

- Automotive OEM: Wider EDI participation by vendors
- Automotive Tier Supplier: Corporate-wide implementation of standard ERP operating system along with implementation of supply chain software
- Aerospace and Defense OEM: Supplier portal to e-exchange data
- Aerospace and Defense OEM: Implementation of automated Kanban system
- Automotive OEM: SAP supplier portal
- Tier Supplier/Distributor for Automotive and A&D: S&OP/Demand Planning software

Supply Chain Solution Areas for AA&D

Solution components to enable best-in-class supply chains within the AA&D industries are outlined in Figure 5. Each of these areas is defined in Appendix A. For more details with specifics on automotive and A&D, refer to the following Aberdeen Research Briefs: [Aerospace and Defense Supply Chains: Supply Chain Strategies in a Globalized World](#) and [Automotive Supply Chains: Supply Chain Strategies in a Globalized World](#).

Figure 5. Supply Chain Solution Areas



Source: AberdeenGroup, January 2007

Technology Used for Supply Chain Management Areas

Table 1. shows the types of supply chain technology enablers that the AA&D respondents currently use.



- Transportation management has the highest percentage of respondents (52%) indicating that they are using spreadsheets or no system.
- Order management has the lowest percentage of respondents (17%) using spreadsheets or no system. It is also the area in which in-house developed systems are used the most (28%).
- Manufacturing planning scheduling and inventory planning are the areas in which ERP systems are used the most (57% and 55%, respectively).
- Warehouse management and collaboration (supplier/customer) are the areas in which best of breed systems have made the greatest penetration (10% each)

Table 1. Technology Enablers for Solution Areas

	<i>Spreadsheets/No System</i>	<i>In-house developed system</i>	<i>ERP system</i>	<i>Best of breed suites</i>
Transportation Management	52%	14%	31%	3%
Supplier Collaboration	41%	21%	28%	10%
Volume and Program Planning	36%	25%	39%	0%
Customer Collaboration	36%	25%	29%	10%
Supply Chain Visibility	31%	17%	48%	4%
Warehouse Management	28%	17%	45%	10%
Manufacturing Planning & Scheduling	25%	14%	57%	4%
Inventory Management	20%	21%	55%	4%
Order Management	17%	28%	48%	7%

Source: AberdeenGroup, January 2007

Top Improvement Priorities, by Supply Chain Area

AA&D companies have distinct priorities in each of the major supply chain areas. Use the data below to compare the capabilities and improvement priorities of your own supply chain.

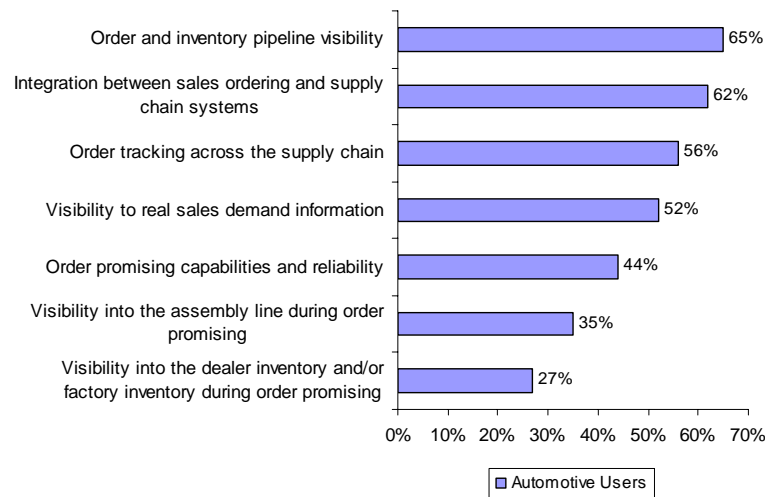
Global Order to Delivery

This area is most applicable to automotive suppliers, OEMs, and dealers. Automotive supply chains have the classic push versus pull problems that result in constant tension between the supply side and the demand side. Sales and marketing is interested in ensur-



ing that the dealers and eventually the end customers get the vehicle that they want in the shortest possible time. To drive improvement, automotive companies report they need to improve their order and inventory pipeline visibility capabilities and better integrate their sales ordering and supply chain systems. In addition, 44% of companies are looking into improving order promising capabilities and reliability.

Figure 6. Top Priorities for the Order to Delivery Process



Source: Aberdeen Group, January 2007

Vehicle Manufacturer Case Study: Success in Order to Delivery

A large European manufacturer of construction equipment and trucks sought to achieve best-in-industry customer service. It deployed a solution from Synchron that included:

- A single order interface to customers that provides available to promise and net pricing information in real time
- Dealer VMI, including automatic replenishment at over 300 dealer sites globally
- Forecast and planning of more than 750,000 different spare parts
- Support of direct shipping, in which goods are delivered directly from the company's suppliers to its end customers

Benefits: "We have gained market share on both the machines and spare parts," says the head of logistics at the company. "The success is directly traceable to the investment we have made in the end-to-end supply chain solution."

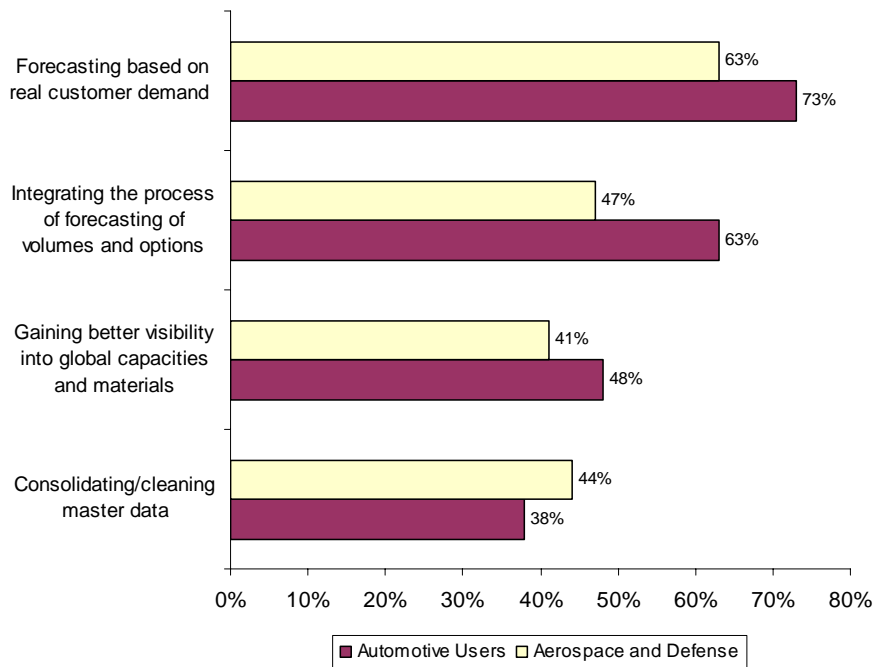
Volume Planning

Given the program-based nature of automotive supply chains, the ability to share capacity and materials across different projects in an efficient manner becomes critical. Vol-



ume planning is the equivalent of S&OP processes in other industries. See Appendix A for more details.

Figure 7. Top Priorities for the Volume Planning Process



Source: Aberdeen Group, January 2007

An automotive OEM in Taiwan has implemented an end-to-end volume planning solution from i2 Technologies with the following high-level workflow:

- Creation of demand plans at dealer store location as well as at model-engine-transmission-critical option level
- Constraining of the demand plans based on supply and labor leveling requirements – knockdown kit (CKD) material constraint, engine material constraint, plant capacity constraint, labor restrictions, etc
- Creation of a master schedule based on the supply and demand constrained plan at detailed fully specified vehicle level. Constraints that are considered are scatter, option capacity restrictions, detailed labor requirements, etc.

Global Supplier Collaboration

AA&D companies are focusing on improving their inventory and replenishment collaboration, and customer management.

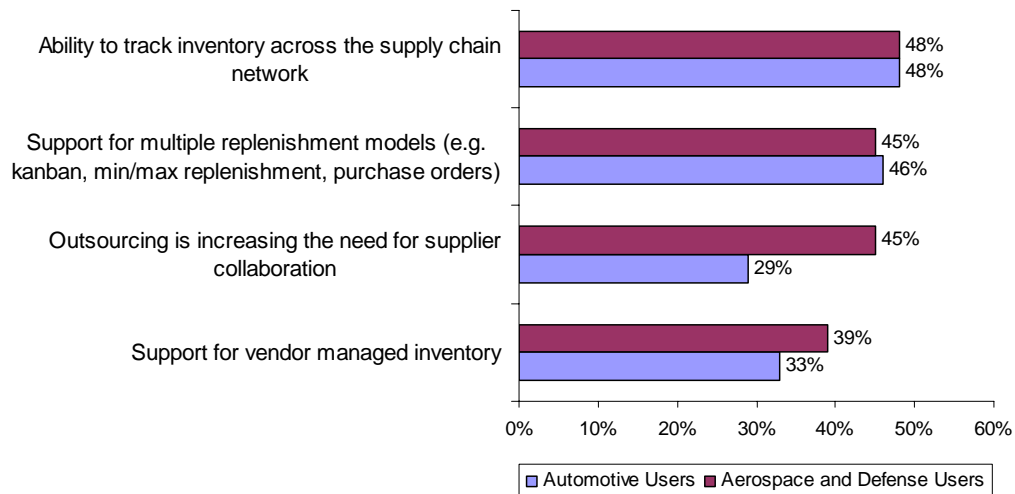


Challenges that the industry is facing with respect to short-term inventory replenishment include:

- Collaborative inventory management with suppliers based on shared online information like forecasts, capacity, etc.
- Traceability requirements, especially within the A&D industry
- The ability to automate the replenishment of parts (especially the C-class parts)
- Implementing vendor-managed inventory strategies like usage-based replenishment

Figure 8 shows the top challenges companies report facing with supplier collaboration.

Figure 8. Top Challenges With Supplier Collaboration



Source: AberdeenGroup, January 2007

The supplier and customer collaboration initiatives that have driven the greatest improvement for companies include:

- Large Tier 1 supplier: EDI with the customer and EDI with inter-company customers and suppliers
- Large Aerospace and Defense Project-Based Manufacturer: Incorporating vendor managed material within our site
- Large Automotive OEM Manufacturer: Demand sharing and demand forecasting
- Large Aerospace and Defense OEM: Automated replenishment system that includes electronic kanban, min/max, automated procurement, and VMI



Automotive Tier Case Study: Delphi Drives Supplier Collaboration

Delphi is an automotive electronic component manufacturer and a major supplier to major OEMs with locations all over the world. Delphi's supply chain was getting leaner and more complex, creating the need for "real-time" information sharing around inventory and orders with its suppliers. Traditional EDI was viewed as difficult to implement and high costs associated with it were an issue. There was a recognized need for a collaborative solution that would let Delphi better manage its inventory and its suppliers.

Delphi implemented a collaborative solution called i-Supply from Tradebeam. Delphi shares forecasts, consumption, shipping, and receipt information with suppliers over this collaborative platform. Delphi uses the platform to place direct orders with many of its suppliers. In addition, a number of high-volume suppliers use the platform to run a min/max replenishment process for Delphi, automatically keeping Delphi stocked with the parts it needs.

Benefits:

- 82% of purchase value currently managed under i-Supply
- Gained real-time visibility in supply chain without requiring extensive internal IT support and infrastructure
- Increased parts management productivity by 30%
- Significantly reduced days of inventory; currently carry 3-5 days of inventory for domestic suppliers

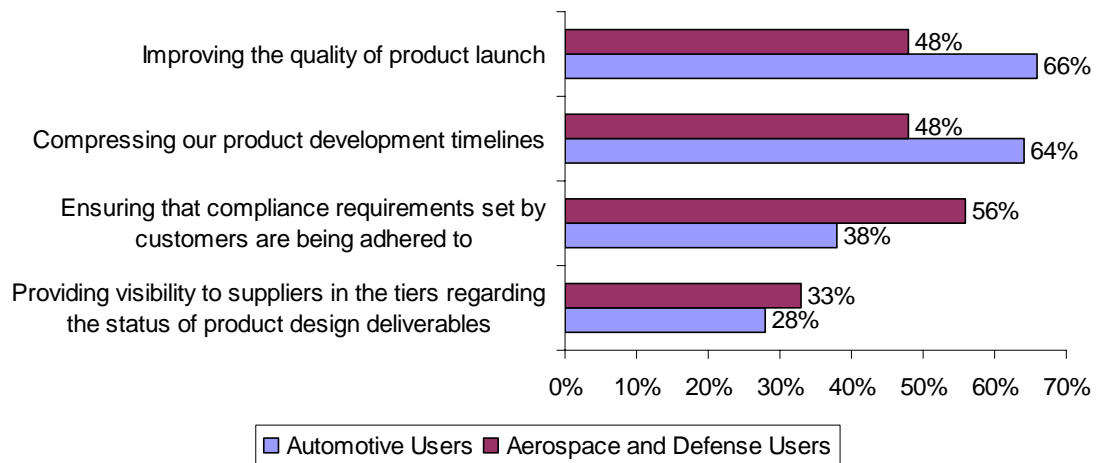


Product Design Collaboration

Globalization is impacting the product design process for new programs or enhancements to current programs. Companies need to factor global sourcing considerations while the products are being designed. This includes the need to compress product development timelines due to elongated sourcing lead-times, the need for improved quality during product development because the tolerances for making mistakes is drastically reduced due to longer lead-times, and the requirement for tighter control and monitoring of product development timelines because of compliance and quality requirements.

Figure 10 indicates the top actions that AA&D companies are taking toward improving their product design process.

Figure 9. Top Actions Toward Improving Product Design Process



Source: Aberdeen Group, January 2007

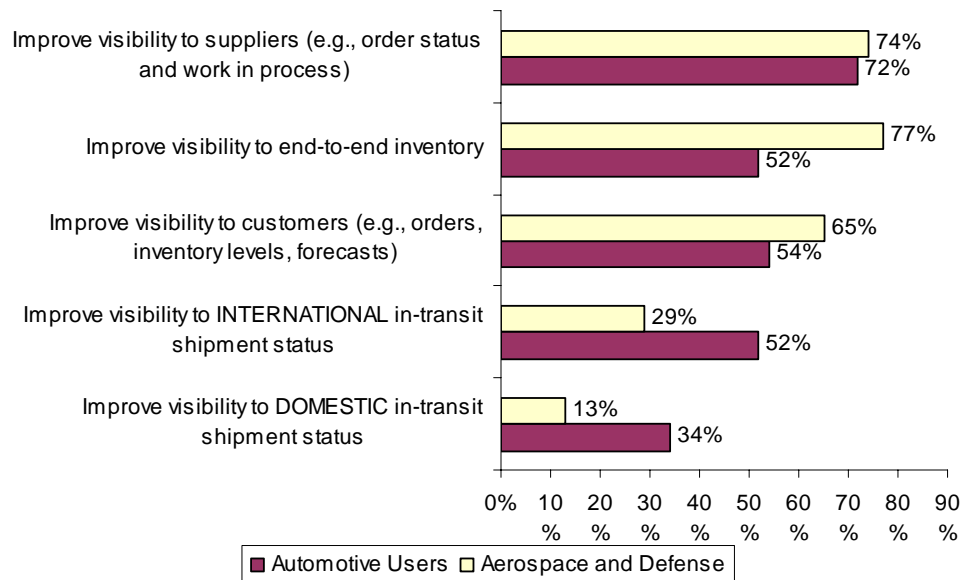
Supply Chain Visibility

The requirement of supply chain visibility is not towards just cost and quality but towards risk management and continuity of supply. Corporate executives are worried about the points of failures that may exist in their supply chain. The defense supply chain leads the rest of the industries in the usage of RFID technologies for supply chain visibility and this is increasingly being looked at within the aerospace industry.



Figure 10 shows the top actions that AA&D companies are planning to take to improve their supply chain visibility.

Figure 10. Top Actions for Improving Supply Chain Visibility



Source: AberdeenGroup, January 2007

Supply Chain Network Design and Inventory Optimization

In a global environment, the ability to plan ahead for the next three to four years regarding the positioning of manufacturing locations, suppliers, and inventory is more important than ever. Network design and multi-echelon inventory optimization tools are vital to making production and distribution decisions based on global optimization rather than local decisions. Global optimization requires incorporating such aspects as:

- a) Logistics – transportation, duties and taxes, material handling, freight lane costs, lead-times and variability
- b) Demand and supply planning – inventory (safety stocks and in transit), customer service levels), demand variability, lead times and variability
- c) Sourcing – total landed costs, source plant costs, capacity restrictions, yield rates

With these tools, companies can decide the global production locations and levels efficiently with minimized budget discrepancies. In addition, by leveraging the existing data into a multi-echelon inventory optimization tool, companies can reduce their end-to-end inventory levels, freeing up working capital.

- A manufacturer with a large dealer network adopted a multi-echelon solution from SmartOps and reduced actual inventory by \$550 million and avoided another \$340 million in additional inventory that would have been held under the previous plan-



ning system. The company can now understand which drivers increase or decrease inventory and to what extent.

B2B Connectivity

B2B connectivity continues to be instrumental to running AA&D supply chains. Increasingly, connectivity must be done across borders to support new facilities being opened in low-cost sourcing locations like India, China, and Eastern Europe. In addition, as suppliers move to reducing their business risks by selling products to as many OEM customers as possible, the need for connectivity system support increases.

Key challenges that AA&D suppliers are facing are:

- Obtaining EDI trading partner compliance as part of customer mandates
- Improving customer satisfaction and ratings
- Designing a standardized business process that can be scaled and rolled out when new customers are acquired
- Creating a competitively differentiating position for new customer acquisition

The packaged application solutions that can help improve B2B connectivity include:

- ERP modules tailored for the AA&D industries
- Integration tools that manage the translation between EDI messages for different OEMs and suppliers' internal systems
- Packaged applications that allow EDI automation to meet connectivity mandates made by OEMs or Tier 0.5-1's.

Supply Chain Finance

AA&D suppliers have been increasingly stressed by the shifting of costs further up into the supply chain combined with sometimes unpredictable payment times and financial issues from the OEMs and large tier suppliers. Supply chain finance solutions are helping companies create more automated payment processes and extend payment terms while providing suppliers with faster and more reliable access to cash. Aerospace and defense companies are particularly interested in the ability to both pay for and be paid for products and services using progress billing methodologies or milestone based payment methods. Read the "[Supply Chain Finance Benchmark Report](#)" for more details.

- "Big companies need their buyers and finance people to go to suppliers and see what the pain is all about," says the CEO of a small U.S. aerospace supplier. "Too many issues that delay payment are out of control of the supplier and we get blindsided by cash flow issues. We would reduce prices if they would help us." "We've begun using a third-party early pay program for our large customer invoices," says the corporate treasurer at a small automotive supplier.

"We used to have to wait an average of two months to get paid from the time of invoicing and never knew until payment didn't show up whether there was going to be a problem," explains the treasurer. "Our sales people were constantly trying to chase the money. **Now we get paid in 10 days or fewer.** It's been a godsend for us."

In this program, the supply chain finance provider, InStream Financial, buys the receivables and securitizes it for purchase by its funding partners. This lets the transac-



tions clear the supplier's accounts receivables at the time of purchase, unlike traditional factoring, where the transaction must remain on the supplier's books until the buyer pays.

Global Trade Management

Of increasing importance to AA&D companies is fully complying with government import/export and security regulations. Innovators are also achieving better margins and more price competitive products through Total Landed Cost tariff engineering.

Being able to bypass or contain duties by effectively using preferential trade agreements is definitely the hottest new area for companies in trade compliance as it directly impacts business operations and corporate profitability. AA&D companies are figuring out where to source components, where to do assembly work, etc., in order to engineer the lowest total landed cost for the final sales destination, taking into account preferential trade agreements. This knowledge can impact how to design and manufacture products, where to source goods, and how to price them in the final market.

However, running origin management programs can be very daunting if you don't have a way to track and manage all this in an automated fashion. For instance, some companies in the automotive industry have seen fines because they haven't been able to support their NAFTA qualifications through certification. For instance, changes in Bill of Material can result in a different outcome as far as eligibility is concerned – so companies need the ability to report and track BOM changes. Eligibility can also change if currency exchange rates shift, changing the value of the materials.

- Renault, with its Logan car, is an example of a company successfully using tariff engineering to create more price-competitive cars that can serve multiple global markets. The automotive OEM has used TradeBeam's global trade management platform to move from separate import and separate export databases for each country to one global database for all import and export data. This has enabled it to take full advantage of trade agreements in product design and sourcing, lower compliance and documentation costs by automatically reapplying electronic data to different parts of the import/export process, and gain new flexibility to update data while a shipment is in-transit.
- A major North American automotive manufacturer has saved millions of dollars in freight costs by helping its motor carriers fast-track across the border and sharing in the savings. It has accomplished this by participating in the FAST (Free and Secure Trade Lane) program for moving goods by truck across Canada and the United States. Transit times have been shortened and made more predictable, and some of its carriers now can make two trips a day instead of one thanks to the streamlined border crossing process. As part of its process improvement, the company has helped develop a commercial solution that integrates into the broker process and automates truck manifest filing with customs.



Chapter Three: Implications & Analysis

Key Takeaways

- 55% of AA&D companies plan to invest in a supply chain visibility solution in the next 24 months.
- 51% of AA&D companies plan to spend more in 2007 for supply chain technologies versus 13% of companies that indicate that they will spend less.
- 45% of innovator companies wish to partner with their ERP vendor to develop the innovations in their supply chains.

Widespread Interest in Improved Supply Chain Functionality

Aberdeen Research finds that the top three areas in which AA&D companies are satisfied with their supply chain functionality are: warehouse management, volume and program planning, and manufacturing planning and scheduling. But even in these areas, roughly 80% of companies feel that they have current or anticipated future requirements that their existing solutions do not satisfy. As Table 2 shows, AA&D companies are widely dissatisfied with their current technology capabilities.

Table 2. Supply Chain Application Satisfaction Levels

	<i>Inadequate to support current requirements</i>	<i>Adequate for some of our needs but needs improvement in other areas</i>	<i>Meets current needs but we anticipate future requirements that it will not meet</i>	<i>Meets all our current and future anticipated needs</i>
Warehouse Management	21%	36%	21%	21%
Volume and Program Planning	29%	29%	25%	18%
Inventory Management	14%	39%	29%	18%
Manufacturing Planning & Scheduling	4%	39%	39%	18%
Transportation Management	18%	43%	25%	14%
B2B Connectivity (e.g. EDI)	39%	39%	14%	7%
Supply Chain Visibility	32%	32%	29%	7%
Supplier Collaboration	37%	33%	22%	7%
Order Management	25%	36%	32%	7%
Customer Collaboration	37%	33%	26%	4%

Source: AberdeenGroup, January 2007

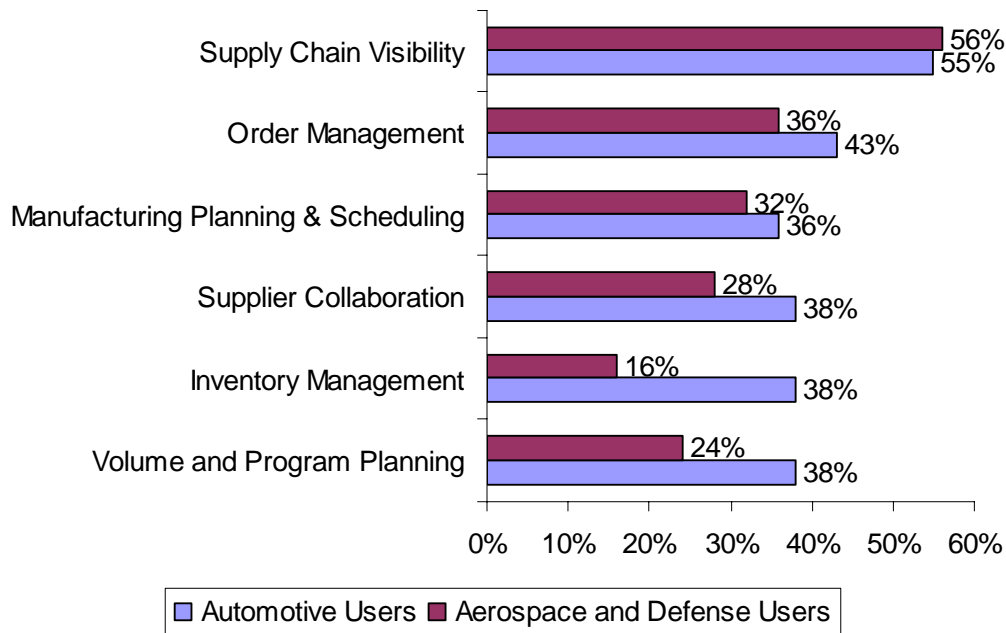
Part of the reason for dissatisfaction lies in the fact that the vast majority of automotive, aerospace, and defense companies run major parts of their supply chain operations on custom or in-house developed technology. Many of these companies are now looking to their ERP vendors or other packaged software providers to help them with the technology needed to enable supply chain transformation and more flexibly adapt to changing business requirements.



Supply Chain Technology Buying Plans

Figure 11 shows the areas where AA&D companies are prioritizing new supply chain software investments in the next 24 months. In the study, participants were asked to list the areas in which they were planning to invest. Supply chain visibility is the top area designated, but there are strong buying intentions across the board for the different solution areas.

Figure 11. Technology Buying Intentions for the Next 24 Months



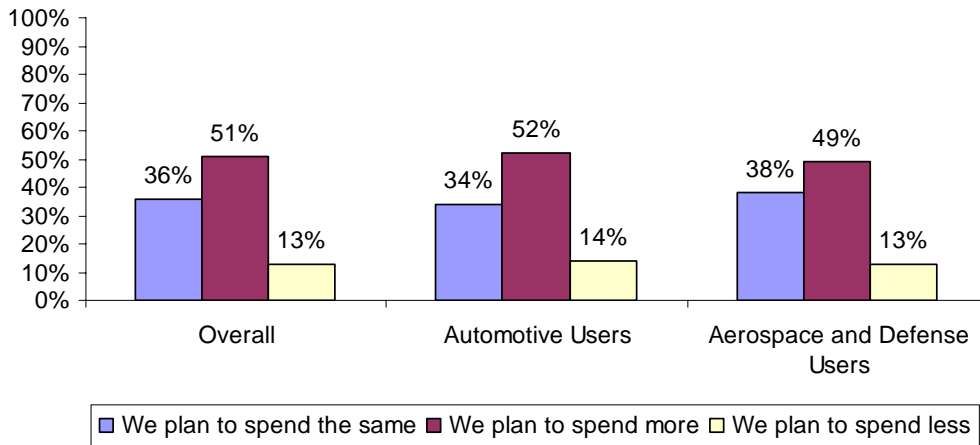
Source: AberdeenGroup, January 2007

Supply Chain Technology Investment Plan, 2006-2007 Comparison

After a number of years of slowed investment in supply chain technology, respondents report that their technology budgets are rising again. Twice the number of participants indicate that they plan to spend more in 2007 versus 2006 (Figure 12).



Figure 12. Investment Plans for New Supply Chain Technology

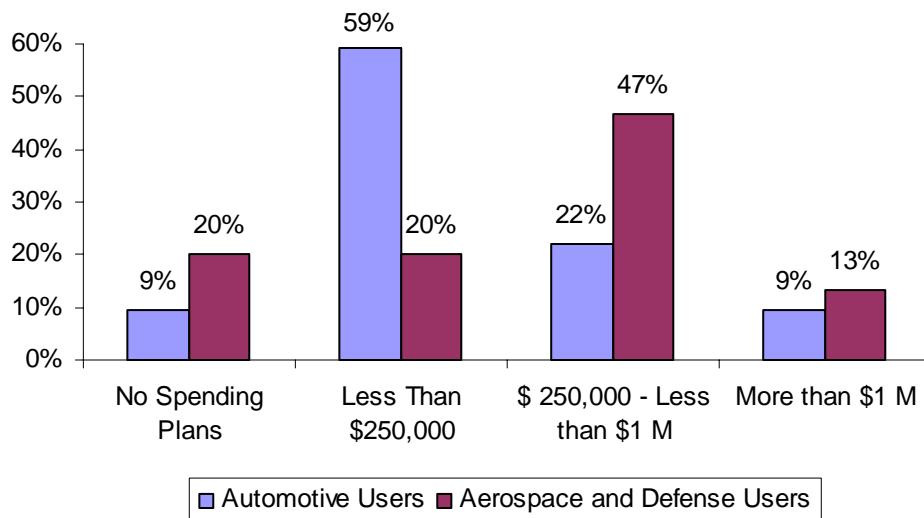


Source: AberdeenGroup, January 2007

Spending Plans

Overall, 85% of companies surveyed plan to spend some money in 2007 for supply chain technology initiatives. Figure 13 shows the spending breakout by industry type. Fully 73% of companies with revenue of over USD\$1 billion plan to spend more than \$250,000 in 2007 for new supply chain technology projects.

Figure 13. Spending Plans for New Supply Chain Technology Projects



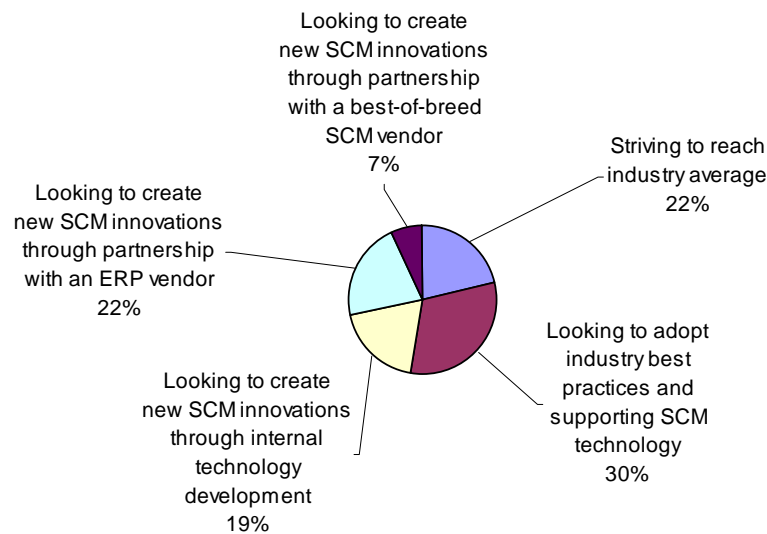
Source: AberdeenGroup, January 2007



Partnering with Packaged Software Vendors for Supply Chain Innovation

Nearly three out of 10 AA&D companies are seeking to partner with their ERP vendor or best of breed supply chain vendor to create **net new** innovations for supply chain. This compares to 19% that are looking to create innovations through custom-developed or in-house development. The rest of respondents are looking to catch up to the industry average or adopt already established best practices for supply chain.

Figure 14. Supply Chain Roadmap



Source: [AberdeenGroup](#), January 2007

For most companies, innovation can be achieved with commercial technology by one of four methods:

1. Employing existing packaged or on-demand software in ways that are groundbreaking for the AA&D industry.
2. Creating new ways to leverage the data and decision-making smarts of commercial supply chain technology for other parts of the organization.
3. Using a composite application approach to create new workflows across multiple commercial applications. A key requirement of solutions in the automotive space is the ability to build business process workflows that are tailored to individual customers (especially for the large organizations). Service Oriented Architecture (SOA) and Master Data Management are two important enablers for these business processes. Enabling a Service Oriented Architecture provides the capabilities for organizations to customize their applications to suit the specific business workflow requirements for their company.



4. Retrofit existing commercial software to try to make it work in a complex business environment. Many supply chain implementations in the AA&D that struggle do so due to customizations that are not maintainable or those that simply do not work.
 - “We underestimated the effort that it took for getting this order management system live,” says the director of a marketing organization within a large automotive and aerospace OEM. “We kept making customizations to it because it did not support our functionality out of the box. Now we have a huge application that even though our dealers love is not maintainable as well as upgradable.
 - “We are now doing a re-implementation with our software partner with standard out-of-the-box functionality,” he continues. “Our software partner’s technology is also now SOA-enabled which will make it more flexible and allow future upgrades to be done more easily.”



Chapter Four: Recommendations for Action

Key Takeaways

- Best in Class companies are currently at a high degree of process automation (either through common systems or multiple systems).
- Best in Class companies are a stage where they are able to make sourcing decisions based on finely tuned considerations of total landed costs.
- Best in Class companies are able to expand their trading partner enablement program through usage of XML, webservices and other light weight internet based technologies.

Assessing Your Supply Chain Management Maturity

Companies can use Table 3 to identify their maturity level across the various solution areas of supply chain management. Areas in which your company is not Best in Class can be targeted for improvement.

Table 3. AA&D Supply Chain Management Competitive Framework

Dimension	Laggard	Industry Average	Best in Class
Automation Level	<ul style="list-style-type: none"> • Mostly manual and spreadsheet driven • High prevalence of in-house inflexible systems • High total cost of ownership of solutions 	<ul style="list-style-type: none"> • Fragmented or departmental IT approach • Some packaged applications that may not fit 100% of requirements • High levels of customizations of packaged solutions increasing total cost of ownership 	<ul style="list-style-type: none"> • End-to-end and cross-functional automation • Movement towards flexible packaged as well as in-house applications to enable business processes



<p>Global Supply Chain Network Design & Inventory Optimization</p>	<ul style="list-style-type: none"> • Companies do network design sporadically or not at all • Inventory handled by function and location 	<ul style="list-style-type: none"> • Companies do network design for warehouse and facilities placement • Some cross-functional collaboration on inventory strategies. 	<ul style="list-style-type: none"> • Companies do network design for improving business growth and supplier network modeling. • Consideration of inventory within Volume and Program planning process. • Single owner of end-to-end inventory.
<p>Global Trade Management</p>	<ul style="list-style-type: none"> • No visibility to total landed costs while making sourcing decisions • Lack of visibility towards actual landed costs • Manual-intensive processes with little enterprise-wide consistency 	<ul style="list-style-type: none"> • Some after the fact knowledge of actual landed costs • Product design has some consideration of sourcing costs but not done consistently • Fragmented IT approach with separate import and export databases per country 	<ul style="list-style-type: none"> • Sourcing performed based on total landed costs • Actual landed costs are captured systematically and leveraged during the planning process • Enterprise-wide trade compliance platform that includes preferential trade agreement optimization
<p>Global Volume and Program Planning</p>	<ul style="list-style-type: none"> • Volume and Program planning process is ad-hoc, with disparate data sources and there is not a single demand number based on which the company performs. Top-down forecast is not tied to plan and there is no formal process. 	<ul style="list-style-type: none"> • Volume and Program planning process is more refined with some level of data synchronization and organizational mandates to arrive at a single demand number off of which the company executes 	<ul style="list-style-type: none"> • Volume and Program planning is a true integrated business planning process where all the organizations involved work collaboratively to arrive at a single demand number off of which the company executes. Margin and revenue focus exists.



Global Supplier Collaboration	<ul style="list-style-type: none"> No ability to collaborate with suppliers or customers Still at a stage where they need help to enable B2B connectivity – using phone, email and fax 	<ul style="list-style-type: none"> Have been able to enable electronic connectivity with trading partners – usage of EDI. Electronic connectivity with top 20% of suppliers. Limited ability to collaborate with suppliers or customers on orders and inventory 	<ul style="list-style-type: none"> Enhanced ability to collaborate with suppliers or customers for orders and inventory – using combination of EDI, XML and faxes in some cases. Ability to bring in additional trading partners due to this approach. Ability to collaborate with suppliers and customers on forecasts, supplier schedules, capacity etc.
Global Supply Chain Visibility	<ul style="list-style-type: none"> No visibility technology 	<ul style="list-style-type: none"> Use homegrown visibility solution and logistics provider systems to monitor shipment status 	<ul style="list-style-type: none"> Use commercial visibility solution to monitor order-line level status, inventory, and mobile assets
Global Order to Delivery	<ul style="list-style-type: none"> Lack of visibility towards lead-times for end to end visibility of order to delivery process Long frequency of planning and scheduling of orders into pipeline (10 days or more) Inadequate consideration of production constraints during planning and scheduling 	<ul style="list-style-type: none"> Some visibility into lead-times during order to delivery process Medium-long frequency of planning and scheduling of orders into pipeline (5-10 days) Some consideration of production constraints during planning and scheduling 	<ul style="list-style-type: none"> Full visibility into lead-times during order to delivery process Daily frequency of planning and scheduling of orders into pipeline (5-10 days) Detailed consideration of production constraints during planning and scheduling

Source: [Aberdeen Group](#), January 2007

Because of today’s more dynamic business conditions, technology support is increasingly critical to selecting and executing a successful supply chain management program. Change management and metric re-alignment also need to be part of the program.

Below are recommendations for action based on a company’s current maturity stage. Whether a company is trying to move its supply chain management practices from “Laggard” to “Industry Norm,” to move from “Industry Norm” to “Best in Class,” or to remain at “Best in Class” status, the following actions will help improve performance:



Laggard Steps to Success

1. Drive to a single operational demand forecast across the supply chain. Look towards standalone S&OP solutions available in the market (especially those that are strong in discrete and can support attach rate capabilities) to enable this.
2. Move towards electronic B2B connectivity approaches like EDI over the Internet or Web-based portals.
3. Increase the frequency by which new sales orders are brought into the planning systems. If current approaches cannot enable this look towards commercial solution providers for this.
4. Look closely into improving the global trade management processes at your company as they are likely to be even less optimized than the domestic processes.

Industry Norm Steps to Success

1. Expand customer collaboration with more dealers, distributors, and retailers to drive to a collaborative single demand forecast.
2. Evolve your supplier network towards on-line process collaboration (forecast, capacity, supplier schedules).
3. Improve your order to delivery lead-times by increasing the frequency of planning as well as improving the ability to plan for exception orders. Improve the ability to react faster to changes in supply by implementing vendor managed inventory and min-max replenishment programs.
4. Look towards evolving your supply chain visibility system outwards by expanding the extent of visibility – more levels of the supply chain, more trading partners.
5. Evolve your supply chain architecture towards a more flexible solution based on Service Oriented Architecture and Master Data Management initiatives. Partner with vendors who provide a vision and a supply chain platform that can scale.

Best in Class Next Steps

1. Move towards “tariff engineering” and total landed cost based sourcing for planning overall supply chain network design.
2. Evolve your Volume and Program planning processes towards an integrated business planning process. Partner with S&OP solution providers who are experts in AA&D and who have the capabilities to solve the industry specific problems like option forecasting, program level forecasting etc.
3. Focus on improved process collaboration building on the electronic connectivity backbone that has been established. Investigate usage based replenishment technologies to improve the inventory management capabilities of your company as well as your suppliers.



4. Investigate approaches by which order to delivery lead-times and finished goods inventory can be reduced (through locate to order capabilities, assembly level visibility during order promising, etc.)

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Appendix A: Supply Chain Solution Areas for AA&D

A) Global Order to Delivery

This solution area refers to the processes associated with capturing an order, promising an order and fulfilling the order from an OEM perspective. The customers for this process are the dealers and the end customers. This is more relevant to the automotive industry.

B) Global Volume and Program Planning

This process refers to the creation of a medium-long term volume/program plan (also called master plan or master production schedule in other industries) based on OEM financial budget considerations, global capacities and material restrictions and customer demand. Some of the requirements for this process are:

- Require ability to manage global financial budget plan based on sales numbers and revenues and tie it to the operational forecasts.
- Require visibility to global capacities and responses buffers and to be able to manage them effectively
- Ability to forecast and plan at a vehicle option level instead of only at product family model levels
- Ability to perform option attach rate forecasting
- Rapid rationalization of suppliers and manufacturing bases require global decision support systems for capacity and materials
- Require the ability to allocate capacity and raw materials across multiple suppliers based on overall capacity utilization and overall profits.
- Require the ability to model lead-times associated with transportation, tooling, manufacturing as part of the long term capacity planning

C) Global Supplier Collaboration

This process refers to the collaboration on various elements like inventory, forecasts, schedules etc between OE and tier 1 suppliers or between tier 1 supplier and tier 2 suppliers, etc. Collaboration entails bi-directional communication and issue resolution using electronic software and well-defined processes.

D) Supply Chain Finance

This process refers to the usage of automated payment processes, extended payment terms while providing suppliers with faster and more reliable access to cash. New funding innovations that rely on improved supply chain visibility are helping lower the end-to-end cost of capital for companies and their trading partners.

E) Supply Chain Visibility



This process involves the ability to track and monitor orders, inventory, and shipments throughout the supply chain. When combined with six sigma analysis methods, it can be a powerful way to lower lead times and inventory levels.

F) Global Supply Chain Network Design and Inventory Optimization

This process involves both the strategic aspect of identifying the best supply chain network to minimize costs and maximize revenue potential as well as the operational aspects of setting the right safety stock levels within the supply chain to be able to meet demand with the lowest inventory.

G) Global Trade Management

This process involves achieving better margins and more price competitive products through Total Landed Cost tariff engineering as well as ensuring compliance to government import and export regulations (e.g., restricted party screenings).

H) B2B Connectivity

This involves the tools and techniques for enabling electronic communication between trading partners (could be dealer – OEM, OEM – tier supplier, tier supplier – tier supplier, tier supplier – third-party logistics partner, etc).



Appendix B: Research Methodology

Between December 2006 and January 2007, Aberdeen Group examined the supply chain management procedures, experiences, and intentions of more than 100 enterprises in Automotive, Aerospace and Defense industries.

Responding supply chain, logistics, sales, marketing and operations executives completed an online survey that included questions designed to determine the following:

In 2007, Aberdeen's research program on Automotive, Aerospace & Defense supply chains will identify best practices around the following questions:

- a) What are the pressures facing the various supply chain stakeholders due to globalization of their supply chains?
- b) What are the technology enablers and process changes that can help companies improve their supply chain processes in a global environment?
- c) Which areas are companies prioritizing to improve their supply chain processes?

Aberdeen supplemented this online survey effort with telephone interviews with select survey respondents, gathering additional information on supply chain management strategies, experiences, and results. In addition recent Aberdeen research on Supply Chain Innovators, Demand Management, Inventory Management, Supply Chain Finance, Global Trade Management was also leveraged for this report.

The study aimed to identify the current status of supply chain applications within these industries, identify the supply chain technology maturity and provide inputs to readers so that they could assess their own supply chain management capabilities.

Responding enterprises included the following:

- **Job title/function:** The research sample included respondents with the following job titles: Senior management (CEO, COO, President, CIO, CFO, Vice President) (6%); Director (28%); Manager (38%), and Staff/Consultant (24%).
- **Industry:** The research sample included respondents from the following industries. Some respondents serve both the automotive and the aerospace and defense industries.
 - Automotive – 66%
 - Aerospace and Defense – 52%
- **Nature of Company**
- Some respondents participate in multiple tiers.
 - Original Equipment Manufacturer – 63%
 - Tier Supplier – 17%
 - Project-Based Manufacturer – 20%
 - Distributor – 13%



- Retailer – 3%
- Logistics Service Provider/3PL – 13%
- **Geography:** 67% of the respondents were from North America. Remaining respondents were from Europe (17%) and 12% from Asia/Pacific. 4% of respondents were from South/Central America.
- **Company size:** About 41% of respondents were from large enterprises (annual revenues above US\$1 billion); 40% were from midsize enterprises (annual revenues between \$50 million and \$1 billion); and 20% of respondents were from small businesses (annual revenues of \$50 million or less).



Appendix C: Related Aberdeen Research & Tools

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

- [*Rethinking China Sourcing: From Total Landed Cost to Total Delivered Profit*](#)
- [*Supply Chain Finance Benchmark Report, September 2006*](#)
- [*Technology Strategies for Integrated Business Planning, July 2006*](#)
- [*Technology Strategies for Inventory Management, September 2006*](#)
- [*Aerospace and Defense Supply Chains: Supply Chain Strategies in a Globalized World, January 2007*](#)
- [*Automotive Supply Chains: Supply Chain Strategies in a Globalized World, January 2007*](#)
- [*Global Supply Chain Benchmark Report, June 2006*](#)

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

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