

Air Force Spares Campaign

Purchasing and supply chain management (PSCM) describes a comprehensive approach that has emerged for linking supply chain management and strategic goals. Under this rubric, commercial firms apply newly defined PSCM techniques and tools to combine functions and obtain performance improvements and reductions in total operating cost. By reviewing the practices of these commercial firms and mirroring the initiatives that support the Air Force spares support strategy, the Air Force can transition its purchasing and supply chain management from a tactical, reactive buying posture into a strategic, proactive force multiplier to help create the performance improvements and cost savings necessary for meeting current and future warfighter needs.

However, this kind of change will not come easily. Leading thinkers in the supply chain field caution that significant and far-reaching changes must be made in order to run successful PSCM improvement programs. Among them are:

- Moving the focus from price cost;
- Moving from a vertical, stand-alone process to a horizontal, integrated one;
- Transitioning from low-skilled to best skilled people;
- Evolving from standard approaches to innovative tools; and
- Changing focus from data to insight.¹

Purchasing and Supply Chain Management

In addition to the standard conditions for success shared by all enterprise-wide change efforts, the Air Force, as a government and military agency, will encounter impediments that may make it more difficult to implement purchasing and supply chain management than in a commercial firm. It will need to address such constraints up front to ensure the successful adoption of purchasing and supply chain management. Examples of such constraints (identified in a RAND study)² include the short tenure of civilian and Air Force executives, a strong functional structure, the difficulty in mining data, and requirements mandated by legislation to support overarching government programs (for example, socioeconomic targets). For

all these reasons, wholehearted adoption of best PSCM practices in the Air Force requires an organizational culture change and can be expected to take at least 3-5 years. To foster such all-encompassing change, purchasing and supply chain management, like all transformational initiatives, needs to be led and supported by top management who can put the PSCM program on senior managers' calendars, set aggressive targets, and appoint the right people as PSCM improvement leaders.³ In spite of the difficult road that surely lies ahead, it should be clear the spares support status quo is unacceptable, and significant benefits can be gained from adopting best PSCM practices.

The Air Force Supply Chain

The PSCM initiative seeks to transform existing, disjointed supply chain processes. The existing structure suffers from numerous process disconnects and points where the supply chain is not yet integrated. These points limit the Air Force's ability to create and foster strategic supplier relationships. Specific examples (Figure 1) include:

- The sustainment supply base is not developed concurrent with initial weapon system and product development.
- Base-level maintenance lacks incentives to get carcasses to suppliers responsively.
- Suppliers see only aggregated, lumpy demand.

Supply Support

- Stakeholders lack visibility throughout the supply chain.
- Requirements and contracting processes are stovepiped and do not promote a strategic focus on the supply chain.
- Disjointed databases inhibit the creation of an Air Force- or DoD-wide picture.
- Procurement is, for the most part, conducted tactically versus strategically.
- End-to-end acquisition practices promote short-term relationships that are adversarial and lack communication and trust.
- The focus of the contract monitoring function is reactive and organizationally separate.
- No single entity manages the supply base, now or for the future.
- Supply chain managers are responsible for supply chain performance, but they do not have the authority or appropriate tools to manage the supply chain.
- Supplier performance may not always match need, and corrective actions are not always taken.
- Operational data are not linked to contracting data.
- No one manages key suppliers from a strategic Air Force perspective.
- Budgeting and financial incentives drive short-term supplier relationships.
- Supply chain managers are not fully or properly trained in best commercial PSCM practices.

These process disconnects are symptoms of at least six underlying supply chain management issues:

- The metrics and incentives throughout the supply chain are not aligned with strategic goals.
- Life-cycle supply chain management is inhibited by a functional focus.
- No one entity is responsible for managing the supply base and supplier relationships.
- Sourcing is largely tactical rather than strategic.
- There is a lack of visibility throughout the supply chain.
- The workforce is inadequately educated and trained.

Correcting these shortcomings will require fundamentally changing the way the organization conducts its work. Providing supply (parts) has traditionally been the responsibility of the purchasing function, while the demand side has been the responsibility of the supply or materiel management function. Historically, these functions have been organizationally separate. The resulting functional stovepipes break the link between supply and demand. This, then, inhibits communications and responsiveness, so there is a

lag between when changes occur and when they can be incorporated into planning.

The Commercial Lessons

Increasingly, however, enterprises, including the Air Force, have been under pressure to reduce costs, improve customer service, and focus on core competencies. These imperatives led top commercial firms to reexamine how they are structured to purchase goods and services. Many of these businesses recognized that an organizational structure based on functional specialization makes it difficult to coordinate the interrelated activities required to satisfy their customers. Accordingly, they have reorganized to consolidate the various materiel management functions—purchasing, inventory management, and distribution—to provide a more integrated systems approach, much like the systems approach to management that emerged in the 1960s (Figure 2). Under a systems approach, the objective is to optimize the performance of the system, rather than optimizing the performance of individual operating units. A systems approach also promotes a closed-loop feedback mechanism, whereby the organization can respond more readily to any perturbation (on either the purchasing or supply side) that may arise.

This consolidation approach, which has come to be termed *purchasing and supply chain management*, is generally described as a strategic, streamlined, and integrated approach that seeks to link demand planning; purchasing; inventory management; and supply chain, supplier, and supply base management to create more effective and efficient supply chain integration and develop a more responsive, reliable, and robust supplier base.

The ultimate objective of the integrated supply chain is to synchronize supply and demand so the rate of supply matches the rate of demand along the entire supply chain (including suppliers and their suppliers). While the principle is inherently simple, many perturbations can

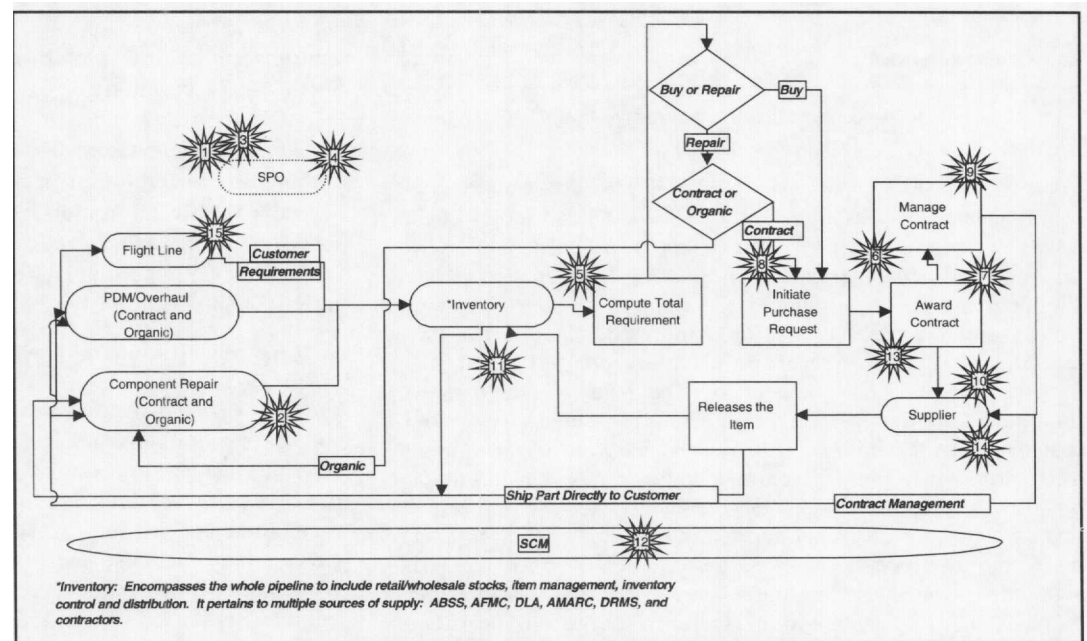


Figure 1. Supply Chain Process Disconnects

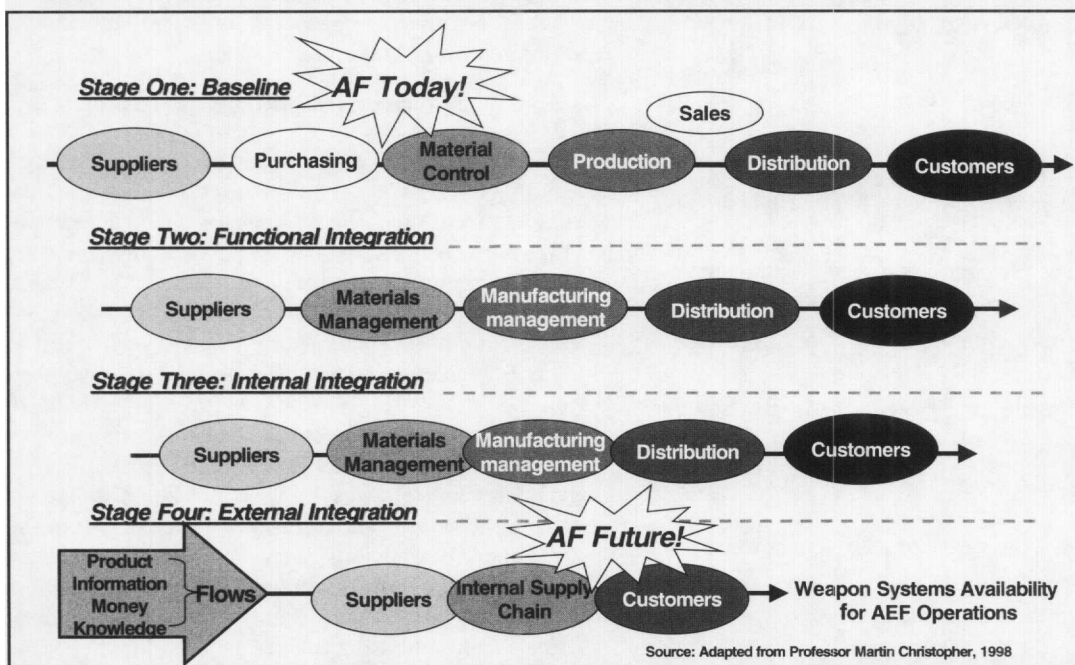


Figure 2. Achieving an Integrated Supply Chain

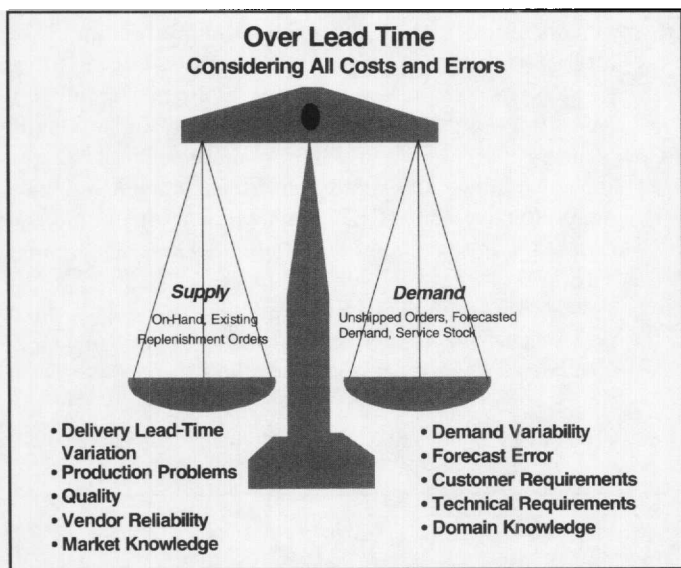


Figure 3. Synchronized Supply Chain

occur on both sides of the scale (Figure 3). Purchasing and supply chain management lies at the nexus of the extended supply chain network, where supply meets demand. In a PSCM organization, personnel gather information from customers and suppliers and pass it throughout the chain to ensure the flow of goods and services meets customer requirements. The complexity of this interaction becomes apparent when it is understood that a balance needs to be achieved at each node of the chain (from supplier's suppliers to the enterprise, to the customers, and then ultimately to the customer's customer) (Figure 4). Distorted information from one end of a supply chain to the other can lead to tremendous inefficiencies: excessive inventory investment, poor customer service, misguided capacity plans, ineffective transportation, and missed production schedules.⁴ Further, the degree of variability in supply and demand in the supply chain is amplified up the chain, creating a bullwhip effect. Because of the amount the safety stock contributes to the bullwhip effect, it is easy to see that, when

the lead times for the resupply of the items along the supply chain are longer, the fluctuation is even more significant.⁵

PSCM As an Approach to Logistics Transformation

Historically, the Air Force has focused its business process improvement and cost-saving efforts on personnel reductions and acquisition reform for major weapon systems. Yet, the purchased goods and services segment of an organization's budget offers a large and growing target for enhanced performance and cost reductions. Commercial firms that have implemented

comprehensive PSCM programs claim initial savings from 3 to 20 percent or more in specific categories, with ongoing new total spend savings of 3 to 5 percent per year.⁶ They also report performance improvements such as quality improvements of 10 to 13 percent per year, delivery responsiveness improvements of 7 to 10 percent per year, and faster product development (almost 3 percent per year) (Table 1).⁷

In fiscal year (FY) 2001, the Air Force purchased more than \$35B worth of goods and services from a broad range of suppliers, including other government organizations (Figure 5). Taking the lowest end of the commercial sector's savings experience, the suggestion is that successful PSCM implementation could result in approximately \$1.5B in annual savings. These savings could be spent on research and development, new systems acquisition, war and strategic stocks, or upgrades to information technology and infrastructure. In fact, purchasing and supply chain management has been proposed by the Air Force as an alternative to the A-76 competitive sourcing strategies for achieving significant cost savings. However, it is important to note that implementation of the Spares Campaign PSCM initiative is not intended as a reduction in personnel, and in that way, the objective is different from A-76. Rather, its purpose is to improve, indeed transform, purchasing and materiel management processes and practices. Accordingly, any savings are to be redistributed to other higher priority Air Force requirements.

The Air Force's Unique PSCM Approach

The PSCM initiative addresses existing, underlying supply chain weaknesses through supporting adoption of an integrated set of activities that will effect transformational change. Industry best practices associated with purchasing and supply chain management continue to evolve as buyers learn from their experiences. Because each firm has its own unique culture, environment, and goals, every organization defines and implements PSCM somewhat differently based on its specific strategy. The Air Force recognized that it, too, would want to tailor its adoption of purchasing and supply chain management

to its unique organizational characteristics. Thus, as part of the supplier relationships effort of the Spares Campaign, the Installations and Logistics Integration staff was tasked with exploring specific opportunities to incorporate commercial best practices, including techniques, methods, customs, processes, rules, guides, and standards, for application to the Air Force. Their work resulted in a recommendation that the Air Force implement the specific PSCM tenets, techniques, and tools enumerated below.

Tenet: Align Purchasing and Supply Goals with Operational Goals

Technique: Establish Outcome and Process-Focused Metrics That Link to Organizational Mission and Goals

Tools: Balanced Scorecard, Supply Chain Council's Supply Chain Operations Reference (SCOR) Model⁸

Organizations state PSCM goals in terms of explicit enterprise-wide strategic goals (for example, reduction in total ownership cost or improvements in performance). Such strategic goals allow the organization to:

- Identify and track metrics that measure PSCM performance over time;
- Compare performance with enterprise and customer needs and other enterprises;

- Measure the performance of internal organizations, individuals, and teams and hold them accountable; and
- Measure the performance of external sources and hold them accountable (for example, shift spending if performance does not meet requirements).

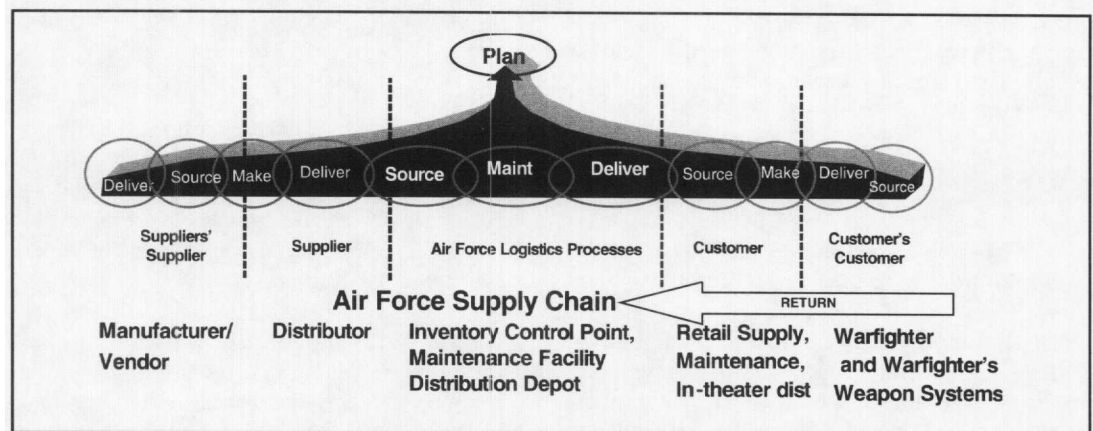
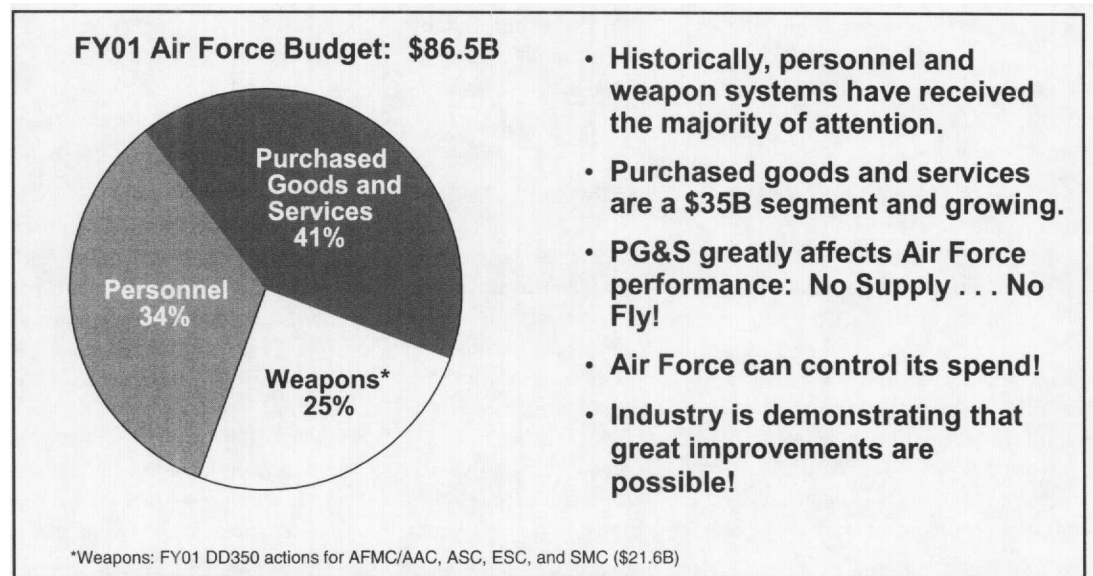


Figure 4. Air Force Supply Chain



- Historically, personnel and weapon systems have received the majority of attention.
- Purchased goods and services are a \$35B segment and growing.
- PG&S greatly affects Air Force performance: No Supply . . . No Fly!
- Air Force can control its spend!
- Industry is demonstrating that great improvements are possible!

Figure 5. PSM Opportunities in the Air Force

Benchmarks	
<ul style="list-style-type: none"> • Reduce total supply chain costs by 3-20% • Improve delivery responsiveness by 7-10% • Increase quality of goods and services by 3-4% 	
IBM <ul style="list-style-type: none"> • Transformation achievements delivered \$12B in competitive advantage. • 4,900 suppliers in 1993—now 50 suppliers account for 85 percent of \$17B production purchases. 	Harley-Davidson <ul style="list-style-type: none"> • Cut suppliers from 4,000 to 800. • Shaved \$40M in materiel costs since 1996. • Integrated key suppliers as resident staffers at plants—now almost 80 in place. • 52-week forecasts of parts demand available to customers.
Honda <ul style="list-style-type: none"> • Saved 17% in 4 years. 	Chrysler <ul style="list-style-type: none"> • Saved \$1.5B in 1998 and \$2.3B in 1999.
John Deere <ul style="list-style-type: none"> • Reduced suppliers from 1,675 to 20—cut costs 13%. 	

Table 1. Industry PSM Benchmarks and Results

Tenet: Gain Knowledge of Where the Enterprise's Money Is Spent

Technique: Spend Analysis

Tool: Customized Databases, Web-Based Spend Analysis Software

Conducting a spend analysis, the first step in a PSCM implementation project, gives the organization insight into how much money is being spent on specific goods and services. In addition, it identifies where those goods and services are being bought and who is doing the buying. This analysis shows how different goods and services rank in terms of the amount spent, who the biggest suppliers are, and where the best opportunities for requirements consolidation may be.

Tenet: Gain Knowledge of the Supply Chain

Technique: Map the Supply Chain, Conduct Process Flow Analysis

Tool: Supply Chain Council's SCOR Model

Purchasing and supply chain management includes the integrated application of well-known concepts of business process reengineering—for example, benchmarking and process measurement—into a cross-functional and cross-enterprise framework. This approach promotes an understanding of the characteristics of the supply chain, where to direct improvement and optimization efforts, and the extent that the supply chain can be effectively contracted out. This activity is also used to determine which supply chain steps are value additive and, in the process, identify opportunities for improvement or realignment.

Tenet: Tailor Sourcing Strategies Depending on Value and Risk to the Enterprise's Operations

Technique: Procurement and Operational Risk Assessments

Tools: Supply Segmentation Analyses, Materiel-Positioning Matrix Studies

A supply strategy refers to the critical choices that must be made when establishing sourcing relationships, such as the number of suppliers, the type of relationship between the suppliers and the buyer, and the length of contract that is most appropriate for acquiring spares or services. The choice of strategy is usually determined by the nature of the items, the importance of the items to the enterprise, and the items' value (cost).

Typically, there is no *one size fits all* strategy for all the procurement in one organization or even in one department. Rather, different strategies need to be developed for different items, based on the item's characteristics. Using a supply segmentation or materiel-position matrix analysis, the enterprise can group its goods and services according to key characteristics and then apply the most appropriate sourcing strategy. Most enterprises will have a continuum of supplier relationships, from an adversarial arm's length interaction to strategic alliances and working partnerships. Similarly, contractual relationships may run the gamut from instant, transactional ordering to strategic, total life-cycle collaborations.

Tenet: Actively Manage the Supply Base

Technique: Supply Base Mapping, Market Analyses, Defense Logistics Agency's Weapon System Capabilities Process

Tools: North American Industry Capability Standards

A significant part of managing relationships is the ability to effectively understand the current and future capabilities of the supply base for a given weapon system, commodity, service, or part. This capability creates opportunities to strengthen existing

partnerships, identify new suppliers for long lead-time parts, and become more efficient across the supply chain. Increased supplier base awareness improves the ability to find new suppliers, create competition in the marketplace where none exists, reduce production lead times, implement tailored supply strategies more effectively, and maintain sources of supply for low-demand goods and services. Market analysis also helps buyers understand the whole picture, which contributes to developing better bargaining power and making better strategic decisions.

Tenet: Optimize the Supply Base

Technique: Market Research, Strategic Sourcing

Tools: Supplier Evaluation Scorecards (Contractor Performance Assessment Reporting System; Government Performance Assessment Reporting System; Red, Yellow, Green Rating System)

Based on the results of its spend and supply analyses, the organization will want to begin to shift spending to its best suppliers, based on reputation and past performance (quality, responsiveness, reliability, and total operating cost) to leverage spending, gain better terms and conditions, and improve quality and performance throughout the supply chain. Partnerships and strategic alliances that produce continuous improvements require dedicated management effort and applied resources; therefore, the enterprise needs to decide which types of relationships are appropriate with each of its suppliers. In most commercial firms, this process has led to a rationalization of their supply base to leverage the spend and reduce the number of relationships that have to be managed.

Tenet: Move from Transactional to Strategic Contracting

Technique: Strategic Sourcing

Tools: Various Contracting Strategies, including Direct-Vendor Delivery, Vendor-Managed Inventory, Performance-Based Services Acquisition (for example, Logistics Contracting), Long-Term Contracts, and Corporate Contracts

Once logical groupings of items have been determined (through the spend analysis and procurement and operational risk assessments), the most appropriate contracting vehicle can be determined based on the specific outcome required for that particular grouping. For example, if it is critical to retain maintenance activity in house, then a vendor-manager inventory arrangement for the piece parts might be appropriate. If, on the other hand, it has been determined that the work under review is not core and a commercial capability should be used, a long-term, performance-based services acquisition agreement may be appropriate. Performance-based logistics (PBL) contracting, in particular, can be enhanced by PSCM implementation. PBL contracting uses logistics performance requirements and contractual incentives to mitigate obsolescence and lower the total cost of ownership through application of flexible sustainment, direct-vendor delivery, technology insertion, reliability-centered maintenance, and public or private partnering and teaming strategies. These techniques and tools can be used most effectively in an environment that also supports strategic supplier relationships and supply chain integration, such as that created by purchasing and supply chain management.

Tenet: Manage Key Suppliers Strategically

Technique: Performance Evaluation, Collaborative Supplier Relationships

Tools: Supplier Evaluation Scorecards, Supplier Management Councils, Strategic Supplier Alliances, and Partnership Agreements

In the past, large inventories often masked quality and delivery problems, leading buyers to believe they really did not need supplier management strategies. However, as enterprises have learned they can simultaneously lower total costs and improve performance, they have become more aware of the critical role buyer and supplier relationships can play in their success. Such partnerships require organizations to take a proactive approach to managing supplier relationships. Instrumental in developing and managing supplier relationships is knowledge of their performance. This entails some form of supplier evaluation system. Strategic management of suppliers also involves sharing information and working together to achieve goals.

Tenet: Link Demand and Replenishment Planning

Techniques: Dynamic Collaborative Forecasting and Replenishment Planning

Tools: Advanced Planning and Scheduling Systems

The large inventories of the past were used to help buffer against variability in supply and demand. However, the business environment has changed. Increased pressure to reduce costs, coupled with acceleration in technology obsolescence time lines, has made it unaffordable and impractical for organizations to stock large inventories. Thus, the unavoidable variances in supply and demand need to be managed as closely as possible to achieve a balanced, projected inventory position a lead time away. The goal is the lowest possible inventory holdings to cover unacceptable risk.

To ensure inventories are kept to a minimum, the organization must be able to conduct detailed analyses within a much shorter time than the historic lead times. This requires PSCM professionals to have a comprehensive understanding of customer requirements (including forecast demand and what alternatives are acceptable) and the sourcing solutions available, including supplier capacity and alternative sources of supply or alternative items that meet the needs of the customer. This, in turn, requires, a constant or dynamic review of the supply chain dynamics that can provide an early warning of escalating costs or poor performance. It also implies materiel management and sourcing functions can no longer remain separate if they are to support the customers' requirement with reduced lead times and lower total cost of ownership.

Tenet: Increase Supply Chain Visibility

Technique: E-Business Applications, Data System Integration

Tools: Web-Enabled Information Systems, Use of Middleware in Concert with Long-Term Supplier Relationships

Electronic business allows seamless supply chain management by using shared data environments with real-time data exchange. The Internet, the World Wide Web, and Business-to-Business Internet market exchanges provide universal and relatively cheap media for data flow. The exchange of real-time data allows optimization of the supply chain functions—including supply planning, demand planning, production or maintenance planning, and inbound and outbound logistics—by allowing all participants (customers, suppliers, logistics managers, and purchasers) to make decisions collaboratively to satisfy logistics objectives. The result is the delivery of goods and services to customers at the right time, place, and cost. New software, known as middleware, facilitates the integration of legacy systems. However, because system integration is often quite costly and time-consuming, long-term supplier relationships are often a prerequisite to developing external supply chain visibility.

Tenet: Align the Supply Chain for Optimal Efficiency

Technique: Lean Logistics, Six-Sigma

Tool: Pert Analysis, Kaizen and Kaikaku, Variance Analysis

To effectively use supplier strengths, a more efficient supply chain is needed. This effort must seek to reduce waste and variance to reduce the time required to meet changes in customer demands. A more efficient process will reduce inventory requirements, improve responsiveness to surges in requirements, and reduce waste and defects. This is a continuous process to seek improvements.

Tenet: Develop an Integrated Organizational Construct

Technique: Blend Critical Skills Sets Around Enterprise, Supplier, and Supply-Base Foci

Tool: High-Level, Centralized, Multifunctional PSCM Organization and Teams

An appropriate organizational construct is required to support a strategic approach to improved purchasing and supply chain management. Many businesses have recognized that an organizational structure based on functional specialization makes it difficult to coordinate the interrelated activities required to satisfy customers. Accordingly, they have reorganized to consolidate the various materiel management functions (for example, purchasing, inventory management, and distribution) to provide a more integrated approach. The objective is to optimize the performance of the whole system, rather than optimize the performance of individual operating units.

In many cases, putting these concepts into operation has led firms to create a new organization to implement strategic policies and strategic relationships with suppliers, while employing a decentralized execution approach. Other firms are moving to a more hybrid PSCM organization with elements of both centralization and decentralization. The centralized organization is responsible for setting up large, complex, strategic partnerships and comprises a multidisciplinary workforce. The lower tier, local organizations, meanwhile, manage centrally established relationships (for example, purchase orders) and set up lower priority, simpler, customized, local contracts. The Air Force also needs to reorganize to meet its enterprise needs rather than local interests. Emphasis must be placed on blending critical skill sets around enterprise, supplier, and supply-base foci. In addition, the organization should incorporate high-level, centralized, multifunctional teams.

Tenet: Automate Routine Activities

Technique: E-Procurement, Outsourcing, Catalog Buying

Tools: E-Business Applications

The PSCM workforce should be transitioned from a reactive buying force to a planning staff. This requires the adoption of automated techniques to reduce manual workload. Routine tasks that cannot be automated and are not core, such as the purchase of office supplies or other commodity items, may be outsourced if a more efficient source, such as a third-party provider, can be found.

Tenet: Develop a More Strategically Focused Workforce

Technique: Refresh, Restructure, and Retrain the Workforce

Tools: Education, Training, Strategic Hiring, Effective Communication, Incentives Aligned with Strategic Goals

The complexity and range of PSCM activities necessitates development of a dynamic, new PSCM professional career path that can be used to grow and retain the most talented staff. PSCM professionals will need to be able to grasp the total value of the supply chain, know how it relates to the broader overall goals and objectives of the enterprise, and have plans to achieve them.

For this type activity, they will have to draw on a range of new and enhanced skills. For example, PSCM professionals will have to demonstrate analytical abilities for undertaking such tasks as market research, total ownership, and financial statements analysis. They will have to be able to work with new information technology, and they will need advanced interpersonal skills. To support its workforce in making this transition, the Air Force must provide new education and training opportunities to enable personnel to grow their skill sets from predominantly *tactical* to *strategic* supply management and sourcing. This is consistent with the Developing Aerospace Leaders initiative that intends growing transformational materiel leaders with credibility in multiple operational occupations to synthesize materiel management efforts. This may have significant impact on some career fields.

Tenets: Pursue Continuous Improvement

Technique: Embed Innovation in the Culture of the Organization

Tools: Six Sigma, Total Quality Management

Purchasing and supply chain management is not an isolated implementation action; rather, it is a philosophy of continuously looking for ways to improve the responsiveness of the supply chain while also reducing costs.

Each of the tenets described above can be considered a building block within an overarching, comprehensive strategy for purchasing and supply chain management. The implementation of these tenets individually will provide only incremental improvement, not the significant transformational improvement that leading companies implementing purchasing and supply chain management have achieved. To illustrate, the Six Sigma program should not be seen as a separate program to purchasing and supply chain management, rather, it should be seen as a tool that supports the ability to achieve continuous improvement in supply.

The Air Force PSCM Implementation Strategy

Following an extensive review of best practices in industry, RAND presented the PSCM vision to the Secretary of the Air Force and the Air Force Chief of Staff in July 2001—both endorsed the PSCM concept for implementation. Additionally, following the Spares Campaign Team's adoption of purchasing and supply chain management as one of its eight initiatives, the Air Force senior leadership overwhelmingly endorsed the PSCM concept at its October 2001 Corona session.

Initial Spares Campaign PSCM activities have been organized around a four-pronged implementation strategy involving: (1) translating commercial PSCM concepts to the Air Force environment, (2) developing PSCM implementation projects at the three air logistics centers, (3) developing strategic alliances with top Air Force suppliers, and (4) developing an e-business strategy to support supply chain management. The PSCM effort built upon cases where the Air Force has already begun to implement some of the tenets, techniques, and tools, such as efforts already underway to tailor sourcing strategies depending on value and risk (Strategic Sourcing).

Translating PSCM Concepts to the Air Force Environment

With the overarching framework defined through PSCM tenets, techniques and tools, and the four-pronged implementation

approach, the Headquarters Air Force (HAF) and Secretary of the Air Force (SAF) PSCM Team began work to build awareness and support for the PSCM concepts within the Air Force. A key event was the first-ever Air Force/Industry Senior Executive PSCM Seminar on 12 February 2002 at Tinker AFB, Oklahoma. The seminar was designed to give base leadership an opportunity to hear directly from renowned industry executives who have led the way for similar initiatives within their firms and benchmark with recognized leaders in industry. The list of representatives included leaders from John Deere & Company, Hewlett-Packard, Motorola, Creative Procurement Strategies, Kemp Enterprises, and Sara Lee. The seminar was a great success. In particular, it established a foundation for the applicability of commercial best practices to the Air Force environment by highlighting the fact that virtually every purchasing situation the Air Force faces has an industry equivalent and a potential solution strategy. The Secretary of the Air Force continues to advance PSCM education and awareness through periodic briefings with Air Force leadership and by distributing reports of the status and results of the implementation project efforts.

The HAF/SAF PSCM Team is also assisting with the development of an organizational model that would create oversight of purchasing and supply chain management. As part of the recent effort to reorganize depot maintenance within the air logistics centers, the Air Force Materiel Command (AFMC) commander has directed the development of an organizational construct to support the PSCM vision of increasing weapon system performance and reducing total ownership costs by strategically integrating materiel management functions throughout weapon system supply chains. AFMC's initial working group identified this new organization as the Purchasing and Supply Chain Management Directorate.

PSCM Implementation Projects

The inclusion of implementation project pilots in the PSCM strategy was designed to showcase practical trials of the PSCM tenets, techniques, and tools and put them into practice in the Air Force environment. It was hoped that, through these limited projects, the Air Force could identify policy and procedural, organizational, cultural, educational, and training requirements to ensure successful implementation on a broader scale. The specific objectives of the pilots are to demonstrate measurable improvements in weapon system support, provide lessons learned in advance of Air Force-wide implementation, and illustrate the use and benefits of strategic supplier relationships.

Originally, the ALC implementation projects were scheduled to run consecutively, beginning in January 2002 with Oklahoma City ALC's (OC-ALC) effort focused on the F100 engine. However, in March 2002, following review of the initial PSCM implementation project activity at OC-ALC, AFMC's commander directed the acceleration of PSCM implementation projects at the two remaining air logistic centers at Robins AFB, Georgia (Warner Robins ALC [WR-ALC]), and Hill AFB, Utah (Ogden ALC [OO-ALC]). Summaries of progress to date follow.

OC-ALC. The weapon system focus of the OC-ALC PSCM implementation project is the F100 engine program, which provides propulsion for all F-15s and the majority of F-16s. As the Air Force's largest sustainment program (approximately \$1B annually), the F100 has consistently been a top Air Force readiness issue. Engine availability is not meeting goals, and parts availability is a significant factor.

As the first major PSCM implementation effort within the Air Force, a cross-functional, organic team at OC-ALC is making

significant headway applying the tenets of purchasing and supply chain management toward the F100 engine program. The OC-ALC organic PSCM Team is augmented by a variety of external resources including RAND, BearingPoint, (formerly known as KPMG Consulting, Inc), Logistics Management Institute, Dynamics Research Corporation, and representatives from the Office of the Secretary of Defense's Change Management Center.

Implementation methodology is divided into three phases: (1) baselining the current process performance; (2) formulation of improved policy, procedural, organizational, cultural, educational, and training processes; and (3) implementation of the *to be* state. Activity to date has involved applying spend analysis and supply chain mapping techniques to develop cost, performance, and process baselines for the entire F100 supply chain from the supplier's supplier to the customer's customer. This deep-and-wide look at current processes is necessary because the Air Force previously has not approached the F100 supply chain from a strategic viewpoint.

The OC-ALC Team has been gathering and analyzing the spend data from FY99-01 to begin developing materiel management and supplier strategies for the near- and long-term future. They have also been mapping the global supply chain of the F100 into an industry standard (SCOR) model to allow supply chain benchmarking with best commercial practices. Additionally, they have been evaluating some of the short- and long-term educational and organizational issues that are critical to designing an integrated supply chain for the F100. Development of this *as is* supply chain baseline concluded in June 2002, and now the PSCM Team is shifting its focus to using the data to support the development of specific supplier strategies and identifying supply chain optimization opportunities and tailored solutions.

WR-ALC. The PSCM implementation project at WR-ALC is focused on the C-130B-H platform. The WR-ALC Acquisition Center of Excellence is currently forming a cross-functional, organic team to begin applying the tenets of purchasing and supply chain management toward this program. The team will be augmented by a variety of external resources, similar to those at OC-ALC.

The initial steps will mirror those of the OC-ALC implementation, including gathering and analysis of historical spend data, mapping the global supply chain of the C-130B-H into an industry standard model, and evaluation of some of the short- and long-term educational and organizational issues critical to designing an integrated supply chain for a weapon system. After baselining the *as is* supply chain, the PSCM Team will begin developing materiel management and supplier strategies for the near- and long-term development options and move toward implementing a streamlined and improved supply chain. This implementation project will have an added component that emphasizes building on an ongoing e-business effort between WR-ALC and key C-130 suppliers.

OO-ALC. This air logistics center has decided to focus PSCM implementation on its Commodities Directorate. As at WR-ALC, the Acquisition Center of Excellence will direct the project. A detailed project plan is being developed, but initial steps will follow a methodology consistent with that in place at the other two air logistics centers.

Developing Strategic Alliances with Top Air Force Suppliers

The purpose of building effective supplier alliances is ensuring supply, today and in the future, at an affordable cost. A

recommended strategy for achieving this goal is to develop strategic alliances with key internal and external suppliers. Through its PSCM initiative, the Spares Campaign has started down a path of implementing strategic partnerships and agreements with a number of its top suppliers in terms of spending. Examples of such relationships are detailed below.

- **Lockheed Martin.** At WR-ALC, partnering has commenced with Lockheed Martin, a key player in the C-130 sustainment program that supports the PSCM initiative in two ways: (1) creating a partnership with the Air Force's largest supplier in terms of spending and (2) developing an e-business strategy for an Air Force weapon system. Lockheed Martin has been collaborating with the Air Force over the last 12 months to develop broader integration across the two supply chains to provide better weapon system support. Initially, Lockheed Martin and the Air Force initiated an e-procurement pilot supporting the Web-based purchase and sales of spare parts and services for the C-130B-H platform. Currently, that effort is evolving into a broader effort aimed at leveraging initiatives that are already in progress or planned for other weapon systems and at bringing those initiatives to bear on a single weapons platform—the C-130B-H. Lessons learned will be migrated to other Lockheed Martin platforms and beyond the Air Force/Lockheed Martin relationship. As a concrete endorsement of this activity, in March 2002, the Air Force Deputy Chief of Staff, Installations and Logistics; Air Force Directorate of Supply Chain Integration; SAF Contracting; and WR-ALC commander signed an e-business Supply Chain Integration pilot memorandum of understanding (MOU) with Lockheed Martin to establish an official framework for these collaborative efforts.
- **Northrop Grumman.** The Supply Chain Integration PSCM staff has also recently begun dialogue with Northrop Grumman and has begun the processes of developing an overarching MOU and concept of operations with them to support Spares Campaign goals of increasing weapon systems availability and expanding mission capabilities. Initial efforts will focus on integrating with the C130 PSCM pilot implementation project plans, but the future vision is for strategic integration initiatives across the Air Force. Of particular interest to the Air Force is Northrop Grumman's spend analysis capability, which might serve as one of several benchmarks for the Air Force as it explores developing its own internal capability in this area.

Developing an E-Business Strategy to Support Supply Chain Management

The technological opportunities in today's environment are key enablers for the logistics and supply chain management transformation process. Using modern information systems, organizations can establish a gateway for the electronic relationship between themselves and their suppliers via the Web. Once the relevant logistics information is digitized and harmonized, it can be distributed throughout the supply chain without manually rekeying. Associated efficiencies result, such as an increase in the velocity of data exchange, removal of time lags from the system, reduction in the number of transactional errors, and cuts in lead times. Together, these efficiencies result in lower inventory levels, removal of process inefficiencies, improved product quality, more meaningful management information (business intelligence), and reduction of the

deployment footprint. They also create cost savings—commercial examples indicate that enabling the supply chain with e-business technology has helped companies achieve more than a 20-percent reduction in supply chain costs.⁹

Recognizing the critical role such technologies can play in automating routine activities and increasing supply chain visibility and integration, the PSCM Team began, as part of its initial activities, to become further educated in the field of e-business and develop examples of practical and implemental e-business strategies. It is the intention that lessons learned in the initiative's pilot activities will facilitate the intelligent and informed application of e-business to the Air Force supply chain.

E-Procurement Pilot Project

Under the sponsorship of the Deputy Chief of Staff, Installations and Logistics and SAF Acquisitions, WR-ALC recently completed pilot testing of e-procurement concepts in the C-130B-H spares environment. The project supported direct e-procurement of unscheduled maintenance parts from Lockheed Martin and other vendors for micropurchases up to \$2,500 and purchases up to \$25,000 made with existing contractual agreements using the Government-Wide Purchase Card. The focus was on unscheduled parts not available through established retail and wholesale mechanisms. This effort, which was operational for 60 days, established a .com sourcing and buying environment for the C-130 support team.

Although small in scope, the implications of the pilot were significant. Moving Air Force suppliers toward electronic catalogs with real-time pricing and availability data is a key step in moving materiel managers away from tactical and into strategic roles. Furthermore, the project helped highlight key policies, processes, and issues that must be addressed for the effective implementation of electronic purchasing across the Air Force.

Follow-on efforts focus on incrementally expanding the suite of e-business applications to the supply chain. It is envisioned that such expansion will be conducted in an integrated fashion with key Air Force suppliers, including Lockheed Martin and Northrop Grumman, but individual solutions will be designed to be nonvendor-specific. All this activity supports the ultimate Air Force e-business and e-commerce vision of having an enterprise-wide electronic environment in place by 2010 where best business practices and enabling technologies are used to facilitate efficient exchange of business information.

Conclusion

For the Air Force, managing the supply chain is a critical element of its strategy to improve logistics to the level necessary to support the expeditionary aerospace force. The commercial sector has demonstrated that adopting PSCM best practices can help make radical improvements within sustainment and operational activities. With its strategic focus on purchasing and supply activities, purchasing and supply chain management ensures supplier relationships, supply chain, and supply base strategies are focused on the strategic goals of the organization—in this case, creating improvements in performance, quality, responsiveness, along with a reduction in total weapon system operating costs. Applied with strong leadership, in a comprehensive manner, purchasing and supply chain management can provide powerful support for the Air Force Installation and Logistics supply chain transformation, allowing it to fully step into its ultimate role of providing improved support to the warfighter.

Notes

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2. Nancy Y. Moore, Laura H. Baldwin, Frank Cam, and Cynthia R. Cook, "Implementing Best Purchasing and Supply Management Practices: Lessons from Innovative Commercial Firms," RAND, 2002.
3. Chapman, et al. 71.
4. H. L. Lee, V. Padmanabhan, and S. Whang, "The Bullwhip Effect in Supply Chains," *Sloan Management Review*, Spring 1997, 93.
5. Lee, et al, 95
6. Moore, et al, 13.
7. *Ibid.*
8. [Online] Available: www.supply-chain.org.
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Wing Commander Staib is a Royal Australian Air Force exchange officer in the Directorate of Supply, Air Force Deputy Chief of Staff, Installations and Logistics, and Ms Michaelson is a senior consultant, BearingPoint, Directorate of Supply Chain Integration, Air Force Deputy Chief of Staff, Installations and Logistics.

JL*

notable quotes

Failure to prepare is preparing to fail.

—John Wooden