

Strategic Supply

Abstract. Strategic Supply is a unique industry study that focused not on a single industry, but rather on a process common to many industries known as Supply Chain Management (SCM). We found that the successful, global and innovative companies of today leverage their supply chains to achieve competitive and comparative advantage in their chosen marketplace. Strategy formulation and execution, affecting lasting change and knowledge management are achieved through the skillful application of information systems. We discovered collaboration to be the synergistic force behind emerging SCM theory and practice and a number of key business models and approaches that have promising application to U.S. Department of Defense (DoD) logistics transformation.

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Introduction

“...[W]e have to put aside the comfortable ways of thinking and planning, take risks and try new things so that we can prepare our forces to deter and defeat adversaries that have not yet emerged ...”¹

- Donald Rumsfeld

In marked contrast to the traditional industry study, this study focused on the discipline of Supply Chain Management (SCM). SCM is the art and science of optimizing the flow of products and information through the entire supply chain from the supplier's supplier to the customer's customer. It constitutes an end-to-end process that encompasses the activities shown in Figure 1.

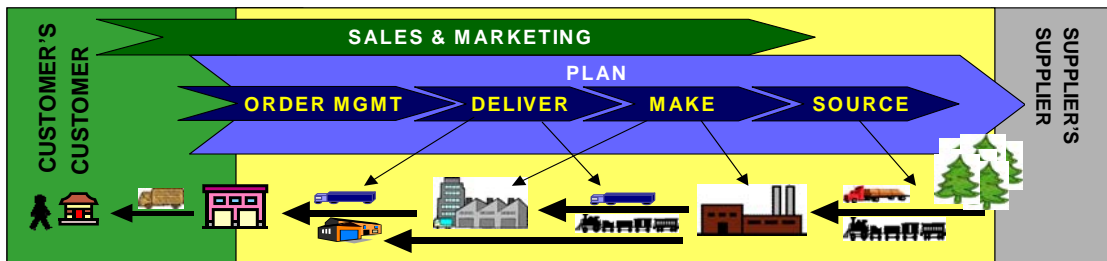
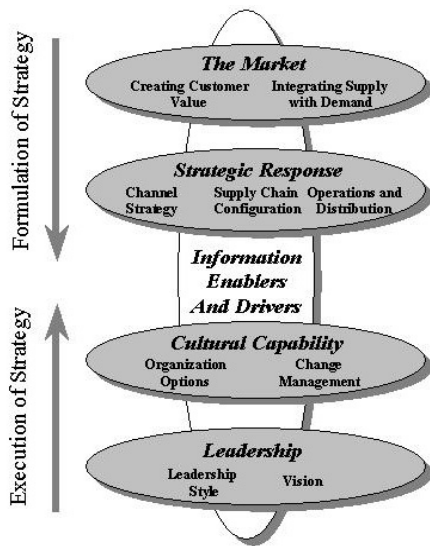


Fig. 1 – The Supply Chain²

Although the feasibility of studying a discipline may not be immediately obvious, there is much to be learned from SCM that is applicable to the Department of Defense (DoD). Commensurate with Secretary Rumsfeld's remarks, by studying SCM we hope to gain insights into present-day corporate practices that can be applied to DoD's transformation efforts. Additionally we hope to better understand the implications of SCM in areas such as mobilization and surge capacity.

The study of SCM allows us to appreciate DoD in a new light, by considering the delivery of its inherent capabilities as a sophisticated and complex version of a supply chain. The effective integration of force structure, systems acquisition and supplier relations that contribute to the generation of capabilities, provide DoD with a strategic richness unlike any other. The subsequent deployment of these capabilities, whether by single service, combined or jointly, in collaboration with other departments, or in coalition with other governments, is enabled by our strategic lift capability, to maintain the reach required of our customer's customer – the American public. In this way, DoD is both a service provider and a customer in the global marketplace.

SCM is not a stand alone process or discipline. Rather, it must be aligned with overall corporate strategy. Companies and organizations must formulate their strategy in a variable, uncertain, complex and ambiguous business environment, while searching for a niche that affords them a competitive advantage. This complex environment includes but is not limited to factors such as the rule of law, and the nature of regulatory frameworks, demographics and geography, globalization and scalability of the enterprise. Many successful companies have adopted the Strategic Alignment Model (SAM) as a means to insure the optimal alignment of the supply chain with the overall corporate strategy.



The Strategic Alignment Model ³
Fig. 2

SAM (Figure 2) is a dynamic framework that integrates the formulation of the enterprise's logistics strategy with the human factors that both create the demand outside of the firm and form the core capabilities inside the firm to deliver the desired strategy to the marketplace. Through the use of Information Enablers and Drivers, SAM knits the Formulation of Strategy (comprised of the Market and Strategic Response) with the Execution of Strategy (comprised of Leadership and Cultural Capability) together to develop overall strategy. We use this model to frame our presentation contained in this work.

Formulation of Strategy

The formulation of strategy begins with an assessment of the external environment and the use of SAM to fulfill at least one specific value proposition: customer intimacy, product leadership, or operational excellence. This becomes the foundation of the organization's core competency from which they formulate their market response by addressing three fundamental issues: the products and or services the firm will sell; the customer segments the firm will serve; and, the geographic markets where the firm will operate. These strategic decisions shape the supply chain strategy by aligning demand flow with customer service.

-The Market-

The industrialized world's economy has changed. During the latter part of the 20th century, and particularly in the last few years, competition in the market place has been on the rise due to decreasing costs of transportation, the information explosion, decreased barriers to foreign trade, a robust and growing world economy, increasingly sophisticated financial markets, an abundance of investment capital, and growth and maturation of communication infrastructure. The impact of globalization and open trade on the global supply chain is significant. Logistics activities comprise 11-16% of world GDP.⁴

Virtually every organization we visited described their customers as "value oriented" – all related that their market was increasingly more competitive. Companies that historically enjoyed little or no competition are now finding themselves in intensely competitive markets. Market shares for some companies have decreased dramatically. It's no longer a "business as usual" environment. In the public sector, funding constraints

and a drive for more efficiency have placed similar pressures upon organizations to improve performance.

SCM is a response to the increasingly competitive marketplace. While some organizations have implemented SCM because they recognized the opportunity to gain a competitive and comparative edge over competitors, others have turned to SCM out of the necessity to survive. For all, the ultimate goal is to decrease costs, increase sales, improve market share and maximize profits. Successful SCM starts with the market. Specifically, it entails understanding customer behavior or demand, then implementing and sustaining a supply chain that delivers value to the target audience.

Understanding Demand. Historically, demand forecasting has had limited applicability in the business world because the level of detail required to be of practical use was frequently not obtainable. Current technology enables more accurate modeling of demand. Larger corporations may have sufficient in-house expertise to perform their own demand forecasting. Companies such as Manugistics, DemandTec and i2 Technologies offer products that model demand. All have different strengths and weaknesses and there is no acknowledged industry leader. Products are rapidly changing and there are a number of new features under development.⁵

However, even good demand forecasts may result in significant errors and the end product should only be expected to identify trends, probabilities and expected ranges of demand. The use of a demand forecast requires monitoring and estimation of errors and the supply chain must expect and account for significant uncertainties in demand.⁶ Demand forecasting is a data intensive process. Tailored to individual companies, models can cost up to several million dollars to produce.⁷ In the long term, the true test of a model will be its ability to be integrated with products that support SCM.

Some businesses have successfully utilized new technology that gives them a reasonably accurate, and most importantly a usable predictor of the demand for their products. A few consider this a 'secret weapon' that gives them a competitive advantage and are reluctant to publicly acknowledge its use.⁸ Some of the businesses that aren't utilizing these methods are wary of the new technologies that make sophisticated demand modeling possible. However, any organization involved in SCM, including DoD, must work within the current limitations of technology and aggressively and continuously pursue enhancing their ability to forecast demand.

Aligning Supply With Demand. Developing an effective supply chain entails aligning supply resources to meet the projected demand.⁹ The ultimate challenge is to bring the right product to the right market in the right quantity at the right price. Much of the current focus of supply chain practitioners is on the strategic response to demand. An integrated and aligned supply chain maximizes the response to these demand signals and allows for appropriate volume changes through the supply channels. These volume adjustments prevent the "bullwhip effect" – where amplified fluctuations in ordering and inventory levels result in excess inventory or shortage costs and an overall unstable supply chain – from occurring.

Sales and marketing efforts can influence demand. Consequently, demand must be continually monitored and refined and the supply chain must be poised to respond to these changes. More specifically, a firm must predict how their own efforts at SCM may impact demand.¹⁰ We found that such forecasts influence the following strategic aspects of the supply chain: the location, capacity and design of manufacturing and distribution

facilities; the design of the transportation network to bring the product to market; determining how supplies, including raw material and labor, are to be obtained in a reliable and predictable manner; and, the application of logistics technology including material handling, warehousing, and the use of information systems to link the various components of the supply chain.¹¹

Creating Customer Value. Organizations that are able to obtain and utilize information about their customers and markets are poised to provide added value to their customers. This detailed information allows them to break out of the “one size fits all” mode of providing goods or services and align their logistics operations with a specific customer segment. The most proficient organizations we met during our study were able to provide a strategic response to the market and achieve: cost reductions through process optimization; improved understanding of costs and their relationships to profits; higher market penetration from increased sales; greater customer loyalty; and, increased product availability. In order to achieve these benefits, an organization must have the leadership, technology and cultural capability to properly formulate the correct strategic response to create value for the customer.

-Strategic Response-

Strategic response addresses three areas – channel strategy, supply chain configuration, and distribution (including inventory and transportation management). In the past, SCM focused on internal processes rather than those external to the firm. Today’s emphasis is to strike a balance between the two in order to maximize competitive advantage. This thrust has manifested itself in the consolidation of distribution centers, increased multi-national partnerships and strategic alliances, and outsourcing non-core capabilities to others.

Channel Strategy. Leadership uses channel strategy to leverage value-added services to enhance process integration in order to deliver the right product at the right price and time, through the right distribution options, to enhance customer, partner and enterprise relationships. For example, The Limited, Inc.’s channel strategy includes proportionate use of brick and mortar stores, catalogs, and the Internet to reach customers who desire to shop in-store, as well as those who prefer the convenience of not traveling to a store, or who might never enter those particular stores, even if accessible. FedEx’s multiple channels, influenced by the need for speed and the desire to achieve maximum profitability include the blending of drop boxes, service centers, phone order centers, and the Internet in order to enhance market presence and customer service.

Direct Channel through E-Business. With the advent of the Internet and today’s consumers looking to save time, a channel strategy that has opened up within the last decade is the consumer direct channel. Also known as Business-to-Consumer (B2C) or e-business, the average consumer now has the opportunity to order merchandise or services directly for home delivery. Success requires a tightly coordinated supply chain. Advantages and enhanced opportunities include¹²: offering direct sales to customers; providing 24/7 access from any location; aggregating information from various sources; providing personalization and customization of information; speeding up time to market; implementing flexible pricing; allowing price and service discrimination; and, facilitating

efficient funds transfer. It also allows the supply chain to take advantage of cost reducing opportunities that result from reduced product handling.¹³

Supply Chain Configuration. Fundamentally, this is a unique network of suppliers, producers and distributors that deliver a specific product(s). Supply chain configuration decisions involve choices such as where to locate new manufacturing and/or distribution facilities and which supplier or set of suppliers to rely on. Different types of product families and different customer segments may often require distinctly different supply chain configurations. The ideal supply chain for one set of conditions almost surely is not ideal for another. It's best to configure a supply chain for a reasonable spectrum of changes so that the chain can adapt without major upheavals, massive reinvestment, or large-scale personnel dislocations. A pioneer and master in harnessing this tightly coordinated supply chain is Dell Computers. By displaying all of their product information over the Internet, customers are able to identify all options available for a personal computer they want to purchase along with the price of the configuration they select. In bypassing the dealer channel, Dell eliminated the reseller's markup and the costs and risks associated with carrying large inventories of finished and perishable goods. This approach resulted in achieving substantial cost advantages. Capital was diverted to activities that added value to their customers. Dell's success has proven that a supply chain's configuration must be designed for flexibility and responsiveness.¹⁴

Alliances and Collaboration. The ability of a business to improve its supply chain performance can be affected by the quality of relationships formed with partners and suppliers. Relationships are identified as either horizontal or vertical, each depicting a unique level of coordination and integration. Horizontal relationships are more stable because of the need to coordinate and integrate across functional areas, seams or silos. Horizontal relationships formed with other businesses improve the performance of the supply chain and are often characterized by collaborative relationships – usually partnerships or alliances.

Partnerships and alliances are subject to a range of interpretations within a given industry and around the world. FedEx's relationship with Philips Semiconductor is an excellent example of both. Philips utilizes strategic alliances to create global sources of supply for its components, primarily from the Pacific Rim. These components, as well as some assembled circuit boards from California, are shipped directly to the Philips owned and FedEx operated warehouse in Memphis. This gives Philips a competitive advantage through its access to much later delivery deadlines by being located in Memphis and using FedEx for their total distribution solution.

The Ford Motor Company provides an excellent illustration of alliances in the auto industry. In 2001, Ford announced an alliance with Caterpillar to improve Ford's repair parts delivery performance. "Ford believes Cat Logistics is the best in the service-parts logistics business, and by combining our strengths, we will ensure the fast and accurate distribution of parts to Ford dealerships and customers. This alliance is a critical element of our strategy to transform service-parts logistics into an improved and sustainable competitive advantage for Ford."¹⁵ Ford has configured their supply chain to capitalize on the ability of an alliance partner to improve customer service, a fundamental component of their value proposition. The decisions of both Philips and Ford reflect supply chain configuration assessments tailored to a company's core business model. In

each case, an increase in efficiency is directly proportional to an increase in customer service and profit.

Our studies provide clear evidence that the strongest and most productive alliances will be those involving balance between partners. In such relationships, values and interests are usually complementary and trust is built between the two parties. One of the most unique we found was Lion Nathan's relationship with two entrepreneurs in the areas of distribution and packaging, and information systems. In return for management advice and financial support, Lion Nathan gained two close partnerships and additional expertise and agility in these critical parts of their supply chain.

Strategic Sourcing. In these relationships, firms seek the greatest value to achieve larger business goals of the organization, not simply the lowest immediate cost. As part of an overall effort to improve customer satisfaction, Ford recently approached its 2,000 suppliers seeking to save billions of dollars by mid-decade on parts, metals and other products. In return, Ford will supply engineers to work with suppliers to test their ideas, and Ford will share 35% of any savings with the supplier.¹⁶ This effort is part of Ford's SCM re-engineering effort to support a goal of building cars to order in 15 days. Ford is seeking to improve their customer satisfaction by closely involving suppliers in the development of new products and the supply chains that support them.

The use of business-to-business (B2B) platforms has achieved some of the goals of strategic sourcing (primarily cost reduction on indirect goods), but it is important to not overstate the power of these types of relationships. Industry e-marketplaces, such as the one managed by Covisint, a joint venture of the major U.S. automakers, clearly offers the promise of more efficient purchasing of common direct goods. It isn't clear yet how popular e-marketplaces like this will be with suppliers. Choosing the best method of strategic sourcing still depends on developing a collaborative relationship with partners that complement a firm's vital core functions.

Alliances and strategic sourcing is clearly critical to building an efficient supply chain that provides competitive advantage. How these terms are defined, and how these concepts are actually employed can differ significantly based on the value propositions of the partners. No "one size fits all" solution for forming strong alliances, and for practicing true collaboration was evident in our visits. Harvesting the true value from such relationships is usually accompanied by a genuine willingness to share risks and benefits, and strike a balance between the relative market powers of the partners.

Trust in the ability of suppliers to provide quality support is also an essential ingredient. This is particularly true in arrangements known as the "Nike Phenomenon". This practice involves outsourcing the manufacturing of product components and thereby increases the reliance on the supply chain to consolidate requirements and deliveries at one or more points prior to the point of sale. In the case of adidas¹⁷, the components of one of their shoes may be outsourced to 30 or more globally dispersed sources. In order to mitigate the risks involved, some of the organizations we visited have adopted a range of supplier certification programs. These may range from the simple sampling of shipments to ensure quality, the use of industry quality standards or ISO certification, up to the actual auditing of the suppliers' processes and capabilities by the customer.

Distribution. Distribution is the strategic response, the how to of the enterprise in order to implement its strategy. Distribution is a fully integrated function that adds value across the supply chain. The importance of distribution's role to the supply chain can be

seen in Wal-Mart and FedEx's supply chains. Their vast array of distribution facilities, information networks and transportation assets are the cornerstones of their operations. Despite their success, they understand that new trends are emerging in the market. The three most dominant being: change in the traditional value-adding roles; a shift from the Buy-Hold-Sell (BHS) to the Sell-Source-Ship (S3) Model of Distribution; and, continued economic growth in the distribution industry.

Value-Adding Roles are Changing. Traditionally, distribution has played four value-adding roles – aggregating, consolidating, deploying and customer service – in moving finished product from manufacturers to points of consumption. Today, these roles are being redefined as the result of change facilitated by improvements in technology, innovative business processes, and new channel participants. The distributor's traditional role in getting products to market is being challenged by the Internet, a dominant trading partner's expectations of better service, and third party logistics (3PL) services.

Internet-based procurement (IBP) is replicating the distributors' consolidator role while doing what traditional distribution has not done – streamlining the procurement process and enforcing purchasing policy. For example, consumers can purchase a huge array of products using their home computers, eliminating the need for traditional distribution. Dell computer's supply chain once again is a key example. IBP has also increased the distribution of goods by 3PL's like FedEx and UPS, who augment and in some cases eliminate traditional distribution models.¹⁸

A Shift in Distribution Models. Today's dynamic market, technological innovations and demanding customers have caused distributors to adjust their way of doing business. Traditionally, distributors buy goods, hold them in warehouses until they are required, then sell them to retail level customers. This model is being challenged by a more cost effective, time-phased delivery of goods model, which reduces cost associated with inventory, and responds more quickly to customer demands. "Sell-Source-Ship (S3) is displacing the Buy-Hold-Sell (BHS) model of distribution."¹⁹ These developments are giving distributors reasons to challenge long-held assumptions about their business models, the markets they serve, and the competitors they face. Under the S3 model, a distributor buys to stock as little as possible, choosing instead to quickly source, ship, and deliver product on the date promised at the time the order was taken. S3 is being adopted because of the drive towards web-based electronic commerce, manufacturers' direct ship programs, and multi-distributor buying groups.

Economic Growth in the Distribution Industry. Wholesale distribution is a large, growing part of the economy. In the trend toward an Internet economy it has become fashionable to say wholesale distribution is an outmoded, declining vestige of yesterday's economy. Without doubt, wholesale distribution is changing, often dramatically, as information replaces inventory as the key to having the appropriate amount of the right product, in the right place, at the right time to satisfy demand. However, the reports of wholesale distribution's demise have been greatly exaggerated. The distribution industry is a key component of the U.S. economy and has showed continual growth over the past ten years. There are no indications that this growth will ebb, even with the recent economic slow down.

Distribution Operations – Managing Distribution Facilities for Strategic Advantage. With so much economic value put at risk by business and technology

changes in the distribution channel, it's hard not to conclude that wholesale distribution represents a significant opportunity for enterprise and supply chain applications.

"Business leaders are continually focused on increasing shareholder value by reducing operating costs while increasing revenues. Firms that invest in superb distribution operations can strongly influence their performance-reducing cost, increasing revenues and raising customer satisfaction."²⁰ To take advantage of the changing distribution market, distributors must adapt to the current trends occurring within the dynamic marketplace.

Today the distribution facility is fully linked to the supply chain. It serves a strategic role as a transfer point of both product and information as well as a vehicle to provide value-added services. Depending on customer needs, distribution facilities are required to fulfill various roles in the supply chain. These include holding inventory, fulfilling demand, providing value-added services, assembling products, reclaiming and managing returns.

Inventory Management. In today's market, inventory management isn't just about handling merchandise in the warehouse or retail stores. How merchandise is handled before it's in inventory, and after it's in the customer's hands, goes a long way in determining how successful the business will be. Without controls and protections in place to give visibility to information about merchandise moving through the supply chain, control of inventory is at risk. A recurring theme with many of the companies we visited was the desire to reduce inventory. However, their nearly unanimous top priority was to ensure there were always products available for the customer, even if it meant sourcing such products from competitors.

Inventory Costs. Capital cost, storage space cost, service cost and risks cost are the four types of inventory cost that are important to the decisions that drive a company's corporate strategy and affect supply chain configuration. Inventory costs are important for three major reasons. First, inventory costs represent a significant component of total logistics costs in most businesses. Second, the inventory levels that a firm maintains at different points in its business will affect the level of service the firm can provide to its customers. Third, cost trade-off decisions between transportation and inventory in business frequently depend upon and ultimately affect inventory-carrying costs. One of the future trends is to outsource and have Vendor Managed Inventory (VMI). VMI is a good way to connect demand and supply planning. "By shifting inventory ownership/responsibility back to the supplier, the inventory managers may be signaling more forceful VMI and supply chain initiatives for the future."²¹

Transportation Management. Today, the transportation department actively participates in solving company problems. Companies no longer look upon transportation as a necessary evil. Rather, transportation can provide fundamental solutions to problems that plague other functional areas. Thus, today's transportation providers must actively interface within and outside historical channels and boundaries. Throughout our study, we found some companies viewed transportation as a core function where others felt it was not. Wal-Mart and Whole Foods maintained their own fleet of trucks for delivery to their customers; General Motors and Ford took the opposite approach and outsourced their entire delivery system. Companies like Kraft maintained a combination where their primary customers received delivery from Kraft's fleet and all other customers received delivery from an outsourced fleet. Without question,

transportation management will be challenged in the future to find ways to reduce costs and develop partnerships (such as through intermodal arrangements) in order to meet customer expectations. As the demand to reduce inventory continues, the loads continue to shrink, and frequency of delivery increases.

Execution of Strategy

All business strategizing and conceptualizing must be realistically tailored to the internal capabilities of the enterprise. In this regard, it must be understood that SCM is about the iron triangle of people, processes, and technology, with leadership at its core as a catalyst for determining the right mixture required to execute the enterprise's strategy and achieve its goals. This was not always understood in the past, as corporations sought to squeeze costs out of the inventory and minimize the distribution trade-offs, through just-in-time inventory practices. Later, the reduction of infrastructure became the focus, closely followed by cost savings through the cross-functional integration of the supply chain process. Now in the 21st century, cost is no longer the sole determinate of choice. Instead, innovative products and prompt satisfaction of demand is key.

-Leadership and Vision-

The SCM strategic leader operates in a world of unique complexity. The breadth of responsibilities is generally a function of three factors – international presence, the type of industry and the firm's supply chain. When all is said and done, the SCM scheme must be in perfect balance with the vision and direction set by the Chief Executive Officer (CEO). At successful businesses, SCM begins at the top. Factors such as company organization, emphasis on training and education, willingness to accept risk and failure, all frame the cultural construct in which the firm operates. The CEO's emphasis on supply chain integration and function, and the nature of the relationship between the CEO and leadership throughout the supply chain continuum are integral to success. A consistent message from senior leaders we met was that today's supply chain manager must possess the ability to work within a political environment, appreciate cultural diversity, be versed in international economics, and understand world markets in both the old nations/states and new borderless ones.

Strategic supply chain leaders are change agents for their organizations, breaking down the barriers between functional silos within their firms and between their partners. Success requires the melding and implementation of a variety of skills and competencies that either the leader himself possesses or relies on others to bring to the table. Today's fast-paced supply chain environment requires agile, multi-talented, visionary leaders who can and want to lead their teams to seek and achieve great things in all circumstances. In SCM, leaders must be passionate about their business, always strive to be out in front of problems and the competition, continually assessing and managing risk, and tirelessly seeking to meet or exceed the demanding expectations of his constituency – his customers, his workforce, and his shareholders.

Vision is Key. In today's dynamic business environment, the key to success lies in having a clear vision. According to Jim Hinton, "The job is to create a rational plan [i.e. vision] for the future of the organization and make sure that the operational chassis

and indicators are in sync with that plan.”²² We found that in the top companies we visited, SCM vision and strategy are complementary – both permeate and are understood throughout the organization. As with many elements of business, there is no one single strategy or vision that works for everybody, everywhere, every time. Vision must be consistent enough to provide guidance over the long haul, but also be flexible enough to change as time and market dictate.

The Unique Dimensions of SCM leadership. As defined by the Chartered Institute of Purchasing and Supply, the supply chain profession is “essentially concerned with the management of a series of interconnected functions or processes which are dependent upon each other.”²³ The leading logistics leaders we met are proficient with managing systems and leading people to enhance shareholder value while simultaneously delighting customers. They are fully committed to SCM and the collaboration necessary to bridge the many seams that proliferate the supply chain. Within the context of a single business entity or functional sub-unit, SCM has a broader vision and greater impact than other functions or processes. In many respects, SCM is the conduit that enables businesses to work more efficiently and effectively.

The biggest challenge confronting SCM leaders is dealing with the many seams – organizational, communication, planning, etc. – that naturally exist in the supply chain. Seams exist both inside and external to the organization. Informational and process gaps that exist between the many different elements of the supply chain present a significant challenge. SCM leaders must establish effective links between the many players involved in order to ensure the process functions as desired and intended. How partnerships or alliances are framed, what level of trust exists or is lacking between parties, and the risks associated with the sharing of data, information or assessments, have strong influence on how effective SCM leadership and oversight will be.

The Special Skills of the SCM Visionary. SCM leaders work in one of the most unique business environments. They are expected to be adept at a number of important and specific skills. A few key ones include: knowing how to cultivate and exploit both personal and relational power; knowing how to effectively mold and cultivate the enterprise so that it achieves organizational excellence; and, be tireless in championing life-long learning.

Time and again, we heard that if communication is instrumental to efficient operations, power – which is derived from position, experience, charisma, training, education, intellect, and strength of relationships with others in positions of power – is the fuel for making things happen. Today’s successful and sophisticated SCM leader fully appreciates the positive and negative implications affiliated with power and his responsibility to use it wisely.

Power management in the supply chain has many dimensions. First, you must know what power you have. Second, you must be willing to use it in order to achieve your objective(s). Third, it requires understanding the capabilities, limitations, and value proposition of your organization, where the sources of power reside and the strengths of the links between elements of the supply chain. Fourth, power management drives the SCM leader to develop an estimate of the situation. This fosters evaluation and selection of the tactics and strategies that will lead to the desired outcome. In small and large firms as well as those with just domestic or a multi-national presence, the importance of factors

like timing, organizational dynamics and the relative importance of interpersonal influence are always being assessed.

The SCM leader relentlessly uses every resource at his disposal to build and cultivate an organization that is always looking for ways to become better. Revolution not evolution is a common mantra. In today's lexicon, he is working to craft a Learning Organization. Organizations of this model not only have a tendency to prosper when times are good, but also find ways to succeed in times of challenge. In the end, it's not the charisma or the dominance of the leader that matters – it's the institutionalized trust in people, the design, and function of the organization and how people individually and in teams respond to constant change that really counts. From corporate giants like Ford to small-scale firms like Yakka in New Zealand, it all boils down to continuous improvement of the process and not who's captaining the ship.

A fundamental challenge for the SCM Leader is to keep his organization on or as close to the leading edge of technology, business practices and competitive capabilities as possible. In this regard, he has many tools at his disposal to achieve this goal. For example, the use of formal or informal mentorship programs, both within and without his organization, can enhance personal relationships and technical skills. From Safe Air to International Paper to the Australian Post, training, education and cultivation of experience is key to these efforts.

Putting it all Together²⁴. Successful trans-national firms (Ford, General Motors, Caterpillar, Kraft) demand that their supply chain managers be orderly in their thinking and processes and have the same general skills as an event planner, except that their "event" is continuous. Relying on a global supply base, the supply chain manager must be skilled in international trade, business and behaviors – he must always have a number of options in mind, and have a real capacity for reacting to contingencies that develop.

The SCM must have a thorough knowledge of the commodities for which he is responsible, including what the world markets are like for those commodities, what the competitive picture is, what the transportation and other logistics are for those commodities, and how those commodities fit into the overall manufacturing process. At places like Ford, the finance department advises the supply chain manager on currency moves and hedges, so he doesn't have to worry about exchange rates, but is expected to worry about other pressures on price.

The Supply Chain Manager's Toolbox of Today. The two most widely used process improvement models used in SCM are Supply Chain Operations Reference (SCOR)²⁵ and Six Sigma.²⁶ The essence of SCOR is to create a reference model that standardizes communication among supply chain partners. It has become an industry "standard" that helps leadership focus on management and process issues from a universal perspective, define, measure, and evaluate supply chain configurations, performance, and strategic plans. Done right, it guides leaders in shaping business process re-engineering, benchmarking, and process measurement efforts into a cross-functional framework. Involvement of corporate leadership at the highest levels is essential to the successful use of SCOR. International Paper has adapted a form of SCOR to facilitate their change management efforts.

Originally developed as a process improvement mechanism for manufacturing, *Six Sigma* has been successfully applied to a wide variety of business processes. The desired result is a high standard of quality and customer satisfaction to at least a

99.999997% level. Perhaps the most meaningful by-product of Six Sigma is the creation of a new “warrior class”²⁷ of leaders through commensurate training that is implemented in order to make the program work.

For those companies that have adopted Six Sigma, it is more than just another tool to manage the process. It is a way of life that becomes the essence of their culture. It is the premier tool used to drive change. As with SCOR, success or failure of Six Sigma is firmly rooted in the commitment and energy imparted by corporate leadership. It is an intensive system that helps the enterprise to focus on the entire supply chain and the nature of the relationships between the links. For firms like Caterpillar, GE and Nokia, it has been instrumental to their efforts in making their world-class business lines more competitive and successful.

The Role of Metrics. The firms we studied develop metrics that are realistic and predictive. Leadership monitors them closely and depending on what they interpret, are either poised or positioning themselves to “tweak” their supply chains to their competitive advantage. In this manner, they are all testing and validating their vision against measured and desired performance and are leveraging a value driven vision to make requisite change. The agility to respond was found to be tempered only by the nature and state of their industry (such as capital investment requirements, legal or regulatory restrictions, etc.), company size and complexity of the organizational structure.

The State of Supply Chain Leadership and Vision Today. As with most endeavors, involvement of top leadership is essential to the success of SCM. It is even more important to inculcate the philosophy and practices of SCM into organizations that are dynamic or are undergoing change. Clearly, the SCM agenda must be part of the CEO’s and top leaders, and remain so even in a change of leadership. Indeed, this is a prime consideration of International Paper as they prepare for a change in senior leadership in 2003.²⁸

In order for SCM to be as successful as possible, leadership must assign top performers to mold and manage the process. Too often firms view improvement initiatives as “projects,” conveying the message that the effort is a temporary endeavor that will not require long-term maintenance. SCM is not one of these initiatives. Successful organizations are committed to assigning the best people to SCM assignments, as they know their performance is critical to the success of the enterprise.

Vision must be value driven and that vision must be well known throughout the company. Firms like GE, Honda America, Caterpillar and FedEx have the reputation for doing this better than most. They understand that their company vision shapes their strategy to “win” and that winning the daily battles is critical to continuous improvement.

-Organization and Culture-

The Cultural Dimension. We found that organizational culture has a direct impact on an organization’s ability to mobilize its human and intellectual capital, to create and maintain competitive advantage. It is a prime enabler for the achievement of corporate goals, particularly through its role in facilitating the alignment of supply chain strategy to the overall corporate strategy. Leadership, vision and culture do not exist in isolation from one another. The impact and power of culture stems from its symbiotic and iterative relationship with leadership, vision and the structure and mechanics of the

organization. This requires the proper creation, care and maintenance of culture by leaders, and its subsequent deployment through an organizational structure that mobilizes the workforce for the commercial battlefield.

The importance of culture as an enabler is best understood when viewed in the context of strategic planning and alignment. After the organization conducts an environmental scan, it formulates a strategy based on the opportunities, threats and value proposition. At some point, changes will be required of the organization and it is in the area of change management that culture exerts its greatest influence. Culture not only enables change, but also determines the organization's capacity to change and speed of adaptation. In larger organizations, subcultures that are differentiated on the basis of characteristics like functional areas, geographic location or level within the hierarchy of the organization also has a role. In essence, culture can be thought of as "how work gets done around here".

Analysis of Organizational Structure. Organizations are being stressed by the increasingly global business environment, as well as by emerging technologies. New technologies are continually offering tremendous improvements in speed and data management options, markets are changing both at home and abroad, and consumer demand for goods and services has increased. The Internet and web based businesses are creating new channels for distribution of goods, services, and information.²⁹ All of these factors are contributing to the constantly changing nature of how organizations and supply chains organize for efficiency and effectiveness of operations.

In our study, we saw evidence of an evolution from functional silos or seams to development of cross-functional teams and processes. This cross-functional arrangement permits not only internal integration, but also encourages external collaboration with strategic partners. This systems approach to accomplishing the overall mission leverages both available technology and human capital. In developing both internal and external communication networks, companies use information exchange and services to reduce costs and increase efficiency.

At General Motors, the importance of organizational flexibility is stressed. An employee may work for two or more superiors – one in the vertical structure and another in a horizontal cross-functional team. To make this matrix structure successful, however, it is critical that the business unit goals of each structural unit be aligned with the company's overarching strategy. The resulting benefits were solid integration of effort and alignment of meaningful metrics with the overall business strategy.

Change Management. Consistent corporate profitability is a function of continuous improvement, and thus of continuous change. Although the change may be as simple as a plant acquisition or capital investment, most effective change requires alterations in corporate culture, particularly when procedural or policy changes cut across functional silos. We found cultural issues, primarily reflected in resistance to change, to be a key contributor in failures to institute effective change. Any change will be ineffective if those who are required to institute it are not willing to do so. There is a distinct difference between the appearance of cooperation and actual willingness.³⁰ The organization and the individuals comprising it must have a culture receptive to change, as the capability to adapt is largely a function of attitude and processes.

As we found in many other aspects of our study, there is no single strategy for managing change; each organization must tailor the process to its own particular

situation. The plan must be guided by the characteristics of each organization, its stakeholders, and the change plan.³¹ While there is no single change management process, we saw several common elements in successful strategies. These include:

Create a sense of urgency. Once the need for change is acknowledged, the imperative for change must be identified; the organization must believe that change is a real and vital necessity for its survival. Passion, not fear, should drive change.

Communication of a clear vision and having a plan to achieve it is critical. Uncertainty prevents successful adaptation; thorough planning is essential.³² Having a clear vision, with changes integral to the overall business strategy, foster unity of effort; benefits should be readily identifiable.³³ A realistic schedule is critical; underestimation of training needs is common and can result in timelines that are too ambitious. Cultural components must be considered – including sub-culture issues. Barriers to change, both personal and organizational, must be overcome³⁴; policies that hinder change must be altered. Having a common value proposition that crosses all supply chain elements will help develop the trust needed to effectively share information and resolve conflicts.³⁵

International Paper's EDGE program to improve management of customer value includes a detailed change plan for the 3-5 year project. The program has been subdivided into a series of steps, each with its own tailored change plan. Taking a different approach, Caterpillar's are tailored to suit the needs of particular elements of the organization.

Communication must be frequent, thorough. Communicating the vision and strategy from the top executive offices – and listening to the responses – throughout all levels is critical; the move to success won't work if the goal is not clear. Key elements are details, redundancy, repetition and promptness in responding to queries.

Grow commitment. Top leadership must be visibly committed to the change – a single leader must rise to champion the cause. All must be resilient, flexible, and focused on the goal. In their change management processes, GM found that stakeholder buy-in at every level was critical; a sure sign of commitment was personal endorsement and allocation of resources. Trust is vital. If stakeholders perceive that leadership is not fully committed to change, they will not support it. If there is no alignment between strategy, culture, and leadership, organizational effectiveness will be degraded.³⁶

Seek to achieve short-term victories. While enthusiasts will continue to support the transformation plan over the long term, most stakeholders will want to see visible evidence that the effort is paying off. Short-term victories consolidate and solidify support for the transformation.³⁷ At Kraft, wide sweeping change was found to be the most effective approach in the long run, analogous to ripping a bandage off quickly. In contrast, GM found that making incremental changes worked much better for them.

Consolidate and embed changes. Organizational processes must be monitored consistently to ensure that new procedures are being executed properly. These may be embedded through implementing organizational incentives and rewards. As the basis for these, new metrics may be required.³⁸

Deal with Resistance to Change Directly. Organizational transformation can be traumatic and will always encounter resistance. This can have devastating effects if not addressed immediately and completely. Recognition must be given to the fact that an organization is formed of people, and as such is a social organism with its own culture, mores and behavioral processes. As with any social group, it operates in a non-linear,

complex fashion, where cause and effect are not clearly related or even visible. If a change plan is based on a mechanical, linear plan, it will probably fail. The human interaction element must be taken into account. If this is done with careful planning and awareness, the transformation can be successfully managed.

-Information Systems-

Today's dynamic business environment demands the ability to quickly, decisively, and flexibly respond to emerging market conditions. Today's leader must know when conditions are changing, where the organization stands in relation to these conditions, and how to best position the business to secure the competitive advantage within the new environment. To do so requires that the business identify and align its business processes with its basic value proposition. Properly aligned, the business is poised to apply information enablers to secure competitive advantage. Too many businesses seek to leverage the potential power of expensive information technology (IT) only to find that they have failed to properly define the focus of these systems. One of the first steps is to model and refine business processes to be the most efficient and effective methods prior to applying IT.

Properly defined and aligned information systems enable a leader's visioning process, provide the foundation for continuous business improvement, and enable the leader to optimize the flow of information along the supply chain. Once a clear vision is defined in a collaborative manner, the organization is ready to move forward to identify metrics that coincide with its business and strategic plans. Effective organizations use both team as well as individual performance metrics that complement its vision and strategic plan. They also use monetary and other incentives to help drive the right behavior.

Applications operate within an environment distinguished by tremendously capable computer systems, global networks, inexpensive interoperability, rapid movement to unregulated open communications standards, and in light of recent world events, growing emphasis on security of both the infrastructure and the information that traverse the global network. They provide the ability to communicate and respond quickly to the right information along the entire supply chain.

Information Exchange -- The Key to Supply Chain Optimization. As we heard throughout our study, functional seams/silos and the isolation of information both within and between organizations represent the most significant challenge to supply chain optimization. Establishing the conditions for the actual exchange of information begins with the physical flow of data. Two major standards currently define the nature of electronic information exchange: the private network language of Electronic Data Interchange (EDI) and Internet based open standard eXtensible Mark-up Language (XML)³⁹.

Businesses will continue to adopt new advances in IT as they are able – both in terms of required investment in intellectual and/or physical capital. Large well-resourced companies have historically found few obstacles to entry into cutting edge solutions and have often leveraged these new capabilities. Electronic Data Interchange (EDI) systems of today are still most often limited to large companies or companies required by large

business partners who use EDI standards. EDI systems still exist today, yet their dominance of the market is declining as new lower cost alternatives arrive.

While many EDI systems rely on older legacy infrastructure extended past its intended lifespan through code upgrades, newer less expensive Internet-based XML communications are able to communicate with both older legacy systems and new more efficient systems. Most importantly, XML provides small to medium-sized enterprises (SME), which by many counts make up 80 percent of any given supply chain, the option to move forward and communicate within the electronic supply chain.⁴⁰ The significance is that an information management strategy that implements a web based system vs. EDI will now work better in global supply chains, especially for small businesses where the costs of purchasing and implementing special software are often prohibitive to bidding on jobs.⁴¹

New applications and niche markets are gaining momentum. Translation software supporting XML to EDI conversion provides the SME additional incentive. Removing the cost barriers to entry, they are also incentivized to share information with larger EDI systems and benefit from the tools that enable greater efficiency and forecasting. Efficiencies shared along the supply chain benefit all, so there is a growing tendency on the part of larger organizations to define their supply chain more fully from the customer's customer to the supplier's supplier. The realization of seamless supply chain operations is moving the industry towards open standards and businesses are realizing significant opportunities and efficiencies.

Leveraging Supply Chain Enablers. There are various types of systems available to an enterprise. The choice of a system or system of systems depends upon certain factors, namely the size and complexity of the enterprise, and the cost of the system. The decision on whether to outsource or keep the IT function in house is dependent upon the areas of specialty within the enterprise. Outsourcing specific functions allows an enterprise to "...reduce their investments in expensive technology, warehousing, and equipment."⁴² Systems should be tailored to the specific needs of the enterprise and leveraged to ensure continued competitive advantage. They afford enterprises the ability to be flexible to change. Specific supply chain systems enabled by IT include: Enterprise Resource Planning (ERP); E-Marketplaces⁴³; private trading-exchanges and hubs⁴⁴; catalogs⁴⁵; and, technology advancements such as Radio Frequency Identification (RFID) tags and new categories of interfacing legacy systems with newer applications.

ERP systems have been enhanced through the development of various analytical applications by companies such as i2 Technologies, Manugistics, and SAP. These companies also provide total logistics services upon request. Analytical applications, included within ERP systems, support planning, operational and strategic decision-making. These applications include: Procurement and Content Cataloging; Advanced Planning and Scheduling; Transportation Planning and Content Systems; Demand Planning and Revenue Management; Customer Relationship Management (CRM) and Sales Force Automation (SFA); and Supply Chain Management. Numerous companies provide ERP tools and services.⁴⁶

Delphi, one of the world's largest auto suppliers, is implementing SAP's ERP Application "SupplySolution." Providing low cost Internet-based connectivity with suppliers, Delphi moves from the fax/phone communications to integrated electronic data exchange. SupplySolution provides Delphi's suppliers web-based access into its

inventory and allows their management of shipments to Delphi. RetailLink, Wal-Mart's ERP tool, provides a conduit for access to and exchange of information with all Wal-Mart stores, distribution centers, suppliers, and other facilities in its Supply Chain.

RFID tags provide a means of tracking goods from plant to store shelf without intervention. One of the significant benefits foreseen in the use of RFID tags is that they would theoretically eliminate the need to conduct inventories by hand. Stores currently spend around \$20,000 to \$30,000 a year conducting manual inventories. For large firms, the investment in RFID could result in significant cost savings.⁴⁷ At Wal-Mart, RFID usage could eliminate the \$ 1.7 billion cost it passes on to its customers that results from shrinkage – theft and damage to goods. In addition, “where today's optical barcodes depend heavily on human intervention and typically are inaccurate about 60 to 70 percent of the time, RFID approaches the Six Sigma standard of 99.999 percent accuracy.”⁴⁸

Collaboration - Internal Supply Chain Technology. GM is using SeeBeyond technology to let automakers link hundreds of internal systems to suppliers, dealers, and consumers so that customers will know when the car they want to custom-order will be available. Sophisticated tracking systems are allowing original equipment manufacturers (OEMs) to see information at the dealership level, identify what was sold, truck location, and what subsystems are moving up through the supply chain. The information is shared and closely monitored by the supply chain, which can project the types of subsystems and components that are going to be required for production. This is an attempt to overcome one of the biggest hurdles in SCM technology – lack of accurate forecasting and the lag in communicating supply and demand fluctuations. What the top tier suppliers want is two way e-business communications. Leveraging EDI and web tools significantly cuts supply chain costs.⁴⁹

Protecting the Global Supply Chain – Information Assurance (IA)⁵⁰. Our visits to industry, lectures, and readings have emphasized the industry goal of getting to an integrated system (with the same language for their company and all of their suppliers) using common platforms that can achieve efficiencies of operation while maintaining a secure environment. This is not easy to achieve in either industry or government where we are often deal with hundreds of legacy systems that cannot interact with each other. Also, during our visits, companies expressed the need to protect proprietary information while making it available to their suppliers on the web. Careful planning, monitoring, and training of users are essential to protect data and maintain security.

Supply chain managers are dealing with such IA challenges as: protecting proprietary information while applying the latest innovative technology and real-time availability of information to suppliers; dealing with threats (from known scenarios like Y2K to unknown threats like terrorist and hacker attacks); and, the use of more collaborative tools to share best practices globally (while protecting information). The Government has a number of agencies dealing with these threats including the FBI, NSA, the new Homeland Security Office, etc. The Department of Commerce Critical Infrastructure Assurance Office (CIAO) and Presidential Decision Directive (PDD) 63 were set up to protect our critical infrastructure. According to the Vice Chairman of the Critical Infrastructure Protection Board, “We've seen cyber attacks before. We're sure to see them again. We want the effect to be minimally disruptive.”⁵¹ Globally, this affects us all daily in some way with utilities, transportation, banking, and other critical infrastructures supporting us.

Internet Exchanges/Hubs and Auction Market Places. The Internet provides businesses with opportunities to expand and increase their profits. Internet exchanges and hubs and auction market places are key examples of e-business. These provide a common means for companies to “collaborate, aggregate, analyze, and share information... and is used to make existing relationships more beneficial to both parties...and offer a buyer the ability to search across multiple supplies when looking for a product. Buyers can make comparisons and select the products that best suit their needs...”⁵² In 2001, Covisint managed more than \$129 billion in transactions, nearly 53% of the estimated \$240 billion spent in 2000 by its three founders.⁵³

In the partnership between Manugistics Group, Inc. and Freightwise, Inc., a new e-commerce initiative of the Burlington Northern Santa Fe Corporation, Freightwise offers an on-line marketplace for buyers and sellers of transportation services and information. Freightwise trading partners are able to share, view, and execute decisions based on real-time information. In effect, Freightwise’s web site automates the transportation and logistics processes by reviewing and selecting the most effective and efficient transportation services across a virtual enterprise.

In 2000, Wal-Mart began a pilot private trading hub with five suppliers to test software that provides for online auctioning and contract-negotiation capabilities. The hub’s software will, “...integrate with and extend Wal-Mart’s existing supply-chain infrastructure, called SupplierLink (made up of electronic data interchange networks and an extranet used by Wal-Mart buyers and 10,000 suppliers to cull information about sales and inventory levels in every store)...the trading hub should allow Wal-Mart to get better deals with existing suppliers through global contracts...it will also let Wal-Mart open bids for contracts on new or different merchandise to all its suppliers which it cannot do with phone or fax negotiations...It’s a major issue for Wal-Mart to find suppliers to handle volume worldwide.”⁵⁴

Future Trends and Management Challenges. The future may see artificial intelligence (AI) systems used to manage global supply chains that respond immediately where product should be manufactured based on current political situations that include labor cost increases, to the movement of that same product to alternate transportation nodes that optimize cost and speed to deal with weather, natural catastrophes, bottlenecks, or unforeseen strikes. “Improving and streamlining product lifecycle processes through integration helps companies manage their increasingly complex global supply chains. A sub area of AI is Expert Systems (ES), which uses knowledge and reasoning techniques that apply reasoning to accomplish a specific task.”⁵⁵

We found some of the management challenges for the future that impact information systems include the decision of whether to outsource in this area and how to deal with the loss of corporate knowledge over the next five years as baby boomers retire. In deciding whether to outsource IT, some of the key decision areas to be examined involve the following: identify the company’s niche and core competencies; list the areas of weakness based upon current skills and technological advancements within the company; and, outsource the processes that are not core competencies based upon the long term costs/benefits to the company’s strategy.

In dealing with the anticipated loss of corporate knowledge based upon the oncoming retirements of the baby boomers within the next five years, successful

companies are implementing a knowledge management system to capture core tacit and explicit knowledge skills that could potentially be lost with experienced personnel retiring. Knowledge management portals include the company's policies, pertinent regulations, "how to" aspects of how to accomplish a process, and templates for letters, reports, etc. Identifying experts in certain areas to share knowledge in a collaborative manner real-time is also an initiative that Ford is considering that will greatly aid in sharing knowledge and saving company time and resources to solve problems. Although not yet developed, the potential benefits of such an arrangement far outweigh anticipated costs. Future successful organizations will spend the money now to implement a tailored knowledge management system to avoid the loss of corporate information in the future and to use much needed collaborative techniques in today's volatile, uncertain, changing, and adapting environment.

Supply Chain Management Take-Aways

SCM is a process not a goal – there are no "Silver Bullets". In four months we had the opportunity to look at nearly 50 organizations engaged in SCM. A few organizations are enjoying tremendous success; some are in the early implementation stages and appear to be headed for success; others are clearly struggling. Some organizations are 'talking the talk' but in reality not 'walking the talk'. Frequently this is due to organizational inertia or the piecemeal application of SCM principles or processes. SCM solutions are not 'one-size-fits-all'. Each organization has to craft an approach tailored to its own unique circumstances and value propositions.

In our examination of how each organization has implemented SCM, several major principles have risen to the top that not only were found in all successful SCM applications, but that would have application to DoD. These are:

Leadership Must Be Enthusiastically Engaged. Successful SCM begins at the top with a strong and visible commitment by leadership. The business vision and strategy must be clearly formulated and fully understood and supported throughout the organization. Leadership must be aware of their own organization and what their core competencies are, and concentrate on those functions while instituting collaborative relationships to accommodate non-core functions. Leadership must also be aware of what costs are and where they are incurred.

Focus on Balancing the "Iron Triangle." SCM is an iron triangle comprised of people, processes and technology - it must be kept in balance as market forces demand and resources allow. It is a holistic approach and needs to be in balance with all parts of the organization rather than focusing on simply one aspect (such as cost or inventory).

Use Information as a Resource. Information sharing is what makes SCM possible; it is critical that IT systems be interoperable throughout the supply chain. Information sharing is critical to success; information must be visible, reliable and timely.

Understand your Organizational Culture. The culture and environment must support the foundational principles of SCM, including information sharing, collaboration, agility, trust and innovation. Any barriers to implementation must be recognized and removed. These include not only rules and regulations, but also organizational silos, philosophy, poor metrics, inadequate compensation and others. The cultural perspective

is critical; problems must be seen as opportunities for success rather than inhibitors; risk must be skillfully managed.

Clearly Define and Focus on the Customer. The customer is king, and there must be a clear awareness of who the customer is and is not. In addition, the market must be clearly understood, as well as the factors that shape that market (e.g., demographics, politics, economics).

Foster Collaborative Relationships. Collaborative relationships are a double-edged sword. While they provide valuable opportunities to share talents and capabilities, there is also inherent risk that must be managed. A careful assessment of the risk vs. gain aspects must be conducted prior to establishing the relationship.

Measure and Reward Performance. Incentives and rewards are a function of performance that can be traced back to specific and measurable standards. In many companies these metrics were based on individual, team and overall performance. A rigorous quality assurance/improvement program such as Six Sigma must be in place. In addition, metrics must be reviewed periodically to ensure their relevance.

Boldly Leverage Automation. Successful SCM businesses don't get by on simply people alone; new technology has made automation an equally critical part of success. The misapplication or over-reliance on automated systems such as ERP can result in catastrophic and expensive failures, perhaps even lead to the demise of the business itself. Automated systems must be tailored to the specific needs of the individual business in order to be properly leveraged to gain competitive advantage. Proper application of technology can potentially transform a business's capabilities.

The Bottom Line

The time is now for DoD to adopt leading edge premises and applications of SCM for their own. Industry and DoD are close partners in peace, and even more so in times of war and crisis. As September 11th has shown, both DoD and industry must possess the innate agility to respond promptly to rapidly changing environments – SCM principles create and enhance that dexterity. To enable DoD and industry to work together in crisis, it is imperative that both groups have structures and processes that can easily mesh and facilitate collaboration.

SCM is not a passing fad to be championed by a modest few, but rather a holistic approach to conducting business. In an environment that requires rapid and flexible responses, which is particularly crucial in periods of limited resources, DoD must enhance its proficiency and effectiveness through utilization of SCM best practices. The results can be transformational, but it is not an easy or quick process. Successful implementation can only be achieved through dedicated and courageous leadership at all levels of the organization, beginning with the top.

As Secretary Rumsfeld has challenged us, "Preparing for the future will require us to think differently and develop the kinds of forces and capabilities that can adapt quickly to new challenges and to unexpected circumstances. An ability to adapt will be critical in a world where surprise and uncertainty are the defining characteristics of our new security environment."⁵⁶

Endnotes

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- ²⁴ Many of the expressed thoughts are drawn from a personal conversation and a series of follow-up personal emails with Mr. John Rintimaki, Vice President, Chief of Staff, Ford Motor Company, ICAF Strategic Supply Seminar Visit, 4 -18 April 2002.
- ²⁵ “Supply-Chain Operations Reference-model, Overview of SCOR Version 5.0,” Supply Chain Council, Inc., Pittsburgh, Pennsylvania, 2001. *SCOR* is a process reference model that attempts to add definition to the management and business processes of an organization. These processes are then evaluated across the supply chain that stretches from the supplier’s supplier to the customer’s customer. *SCOR* takes into account but may not necessarily address the specific issues of training, quality, information technology, and

general management. These elements are left to the organization to incorporate or address by other means. This particular model aids SCM leaders in identifying key supply chain links and functions both within and without the organization and helps to frame the span of their supply chain. The scope of the SCOR process is based on five distinct management processes: Planning, Sourcing, Making, Delivering, and Returning. Three levels of process detail fall within the scope of the model: Top Level (where the basis of competition performance targets are established); Configuration Level (where core operations strategies and configurations are assessed and chosen for their supply chains); and, the Process Element Level (where the organization chooses what definitions and tools they will use to compete in their market).

²⁶ Robert Slater, *Jack Welch and the GE Way, Management Insights and Leadership Secrets of the Legendary CEO*, (New York: McGraw Hill, 1999): 225-230.

²⁷ Slater, *Jack Welch*, 217. Progressing through a martial arts-like discipline, employees are trained in leadership, management and process methods, and techniques with one end-state in mind: superior results. As they complete each level of training, warriors earn one of three classes of belts: green (lowest level), black, and master black. Training usually revolves around a specific project that provides the opportunity to work with concrete problems and achieve concrete results.

²⁸ Edgar H. Schein, "Legitimizing Clinical Research in the Study of Organizational Culture," *Journal of Counseling & Development*, (July/August 1993): 703-708.

²⁹ Carter McNamara, "Basic Context for Organizational Change," *The Management Assistant Program for Nonprofits Home Page*, <<http://www.manpp.org/library/mgmt/orgchnge.htm>> (25 March 2002).

³⁰ R. B. Crawford, "The Management of Change," *HROD-Consultancy*, 2002, <<http://hrod-consultancy.com/Feature Article 1 The Management of Change.htm>> (25 March 2002).

³¹ Fred Nickols, "Change Management 101, A Primer," 2000, <<http://home.att.net/~nickols/change.htm>> (17 March 2002).

³² Fred Nickols, "Solution Engineering, Choosing the Right Problem Solving Approach," *Distance Consulting Company*, <<http://esc-grenoble.fr/SI98/ISTUD/articles/makesdif.htm>> (25 March 2002).

³³ William E. Schneider, "Why Good Management Ideas Fail – The Neglected Power of Organizational Culture," *Strategy of Leadership*, January/February 2000, <<http://www.refresh.com/lneglected>> (25 March 2002).

³⁴ John Kotter, *Leading Change*, (Boston: Harvard Business School Press, 1996): 21.

³⁵ Nick Palmer, "Alliances: Learning to Change", *Accenture Home Page*, <http://www.accenture.com/xd/xd.asp?it=enWeb&xd=ideas/outlook/pov/pov_learning.xml> (25 March 2002).

³⁶ Schneider, "Why Good Management Ideas Fail," <<http://www.refresh.com/lneglected>>.

³⁷ Kotter, *Leading Change*, 118-119.

³⁸ Kotter, *Leading Change*, 21.

³⁹ In 1995 the World Wide Web Consortium (W3C) identified the need for language with the ease of HTML used on the web for text communications to support the exchange of data. The task fell to the XML Working Group that released its first standard in 1998 (see <<http://www.w3.org/>>). XML tags provide a description of what the data is. This capability provides the ability to transmit and validate data with greater fidelity over the Internet.

⁴⁰ Charles C. Poirier and Stephen E. Reiter, *Supply Chain Optimization*, (San Francisco: Berrett-Koehler Publishing Inc., 1996), 225-264.

⁴¹ K.B. Manrodt, M.C. Holcomb, and R.H. Thompson. "What's Missing in Supply Chain Management?" *Supply Chain Management Review*, (Fall 1997): 80-86.

⁴² Clifford F. Lynch, "Price vs. Value: The Outsourcing Conundrum," *Logistics Management and Distribution Report*, Vol 41, Issue 2, (February 2002), <<http://www.logisticsmgmt.com>> (25 March 2002): 35.

⁴³ An E-Marketplace is an "...Internet-based...neutral...broker of a related suite of goods or services within a community of many buyers and many sellers...who does not take possession of the goods or services." Current examples of eMarketplace brokers are Transora (for consumer packaged good space), E-Steel (for steel services), New Medairy (for IT Services), and Procure Zone (for MRO goods). Definition taken from *Information Technology Association of America, ITAA FMU Webcast, Information Technology Services Division*, "The Future of eMarketplace Services: Trends and Forecasts," Leo J. Lipis, presenter, IBC, Tuesday, January 30, 2001. Session transcripts available at <<http://www.ita.org/itserv/013001.pdf>> Slide 4 (21 May 2002).

⁴⁴ *Private trading exchanges/hubs* are business-to-business electronic exchanges on the Internet that foster collaboration and sharing of information in long-term relationships. These exchanges allow "... suppliers and buyers interact to conduct transactions..." They "... provide the opportunity for huge value creation, through the reduction in transaction costs, improved supply chain visibility, and more efficient allocation of supply and demand..." Various types of transactions can be conducted on these exchanges, "...auctions (one seller, multiple buyers), reverse auctions (one buyer, multiple sellers), fixed price transactions (one buyer and one seller), and bid/ask auctions (in which multiple buyers and sellers bid)." Definition taken from Chopra and Meindl, *Supply Chain Management*, 352.

⁴⁵ *Catalogs* are electronic Internet portals that display product information and prices for the purpose of selling items to customers through sales transactions. Catalog sales reduce enterprise inventory, transportation, and administrative costs through direct shipment from factory to consumer.

⁴⁶ SAP (the market leader with approximately 30 percent of the market share); Oracle (the second place leader with half of SAP's market share); Peoplesoft (human resource applications); J.D. Edwards (Building cross-functional systems for firms with annual sales of \$1 billion); and Baan (providing an integrated view of the supply chain rather than specific functions). Companies that consider themselves to be the "Analytical Application Players" include: i2 Technologies (the market leader in the SCM realm); Manugistics (the second leader); and ERP players (SAP, Oracle, Peoplesoft, J.D. Edwards, and Baan).

⁴⁷ Cheryl Rosen, "The Fast Track," *Information Week Home Page*, 18 June 2001, <<http://www.informationweek.com/story/TWK20010618S0001>> (21 May 2002): 22.

⁴⁸ "In the Wake of New U.S. Bag-Matching Rules, Intermec Stands Ready with New Technology to Increase Safety of Air Travel," *Intermec Technologies*, 18 January 2002, <http://biz.yahoo.com/bw/020118/180039_1.html> (21 May 2002).

⁴⁹ Jack Wilderman, *Supply Chain Management: Optimizing the Path from Supplier to Customer*, (Stamford: Gartner Group Publishers, 1999).

⁵⁰ ICAF ISSL-9 Seminar, "Information Critical Infrastructure: Introduction to Information Assurance and Homeland Security," Dr. Faye Davis, faculty presenter, April 19, 2002.

⁵¹ ICAF ISSL-8 Baruch Lecture, "Information Critical Infrastructure: Introduction to Information Assurance and Homeland Security," DoD CIAO Office presentation, 18 April 2002.

⁵² Chopra and Meindl, *Supply Chain Management*, 413.

⁵³ Steve Konicki, "Great Sites: Covisint," *Information Week*, " 27 August 2001, <<http://www.informationweek.com/story/TWK20010824S0026>> (21 May 2002): 1.

⁵⁴ "Retail's Super Supply Chains," *Information Week Home Page*, 16 October 2000, <<http://www.informationweek.com/808/walmart.hmt>> (21 May 2002): 22.

⁵⁵ Stock and Lambert, *Strategic Logistics Management*, 174.

⁵⁶ Rumsfeld, NDU speech, 31 January 2002.