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Business Performance Management

Implementing Integrated Supply Chain Management for Competitive Advantage

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I. RATIONALE
Increasingly, many organizations have begun to embrace the concept of integrated supply chain management. Studies in various industries have shown that supply chain performance could improve if trading partners were able to mutually assess expected consumer demand and plan supply correspondingly.

For example, the 1993 Efficient Consumer Response (ECR) study sponsored by the grocery industry showed that there were excessive inventories in the grocery supply chain. The study estimated that the industry could save $30 billion annually—about 11 percent of supply chain costs—if suppliers, distributors, and grocers could use technology to work closely to deliver products more efficiently to consumers. It was estimated that in the dry-goods segment of the industry, inventories were at 104 days of supply and could be reduced by 41 percent, to 61 days of supply.

Rather than merely serving as one part of the operational strategy, as has been the traditional view, integrated supply chain management gives organizations the ability to alter the flow of resources and value throughout the entire supply chain. The integration of disparate supply chain partners into one smoothly operating, seamless whole results in an agile competitive system—one that can rapidly, effectively, and efficiently provide unique product/service bundles to each customer on demand.

II. SCOPE
This Statement on Management Accounting (SMA) is addressed to financial professionals and others who may lead or participate in efforts to implement integrated supply chain management (ISCM). This SMA provides practical operating principles and recommends approaches for implementing ISCM.

It also provides a rational for implementing ISCM and describes a framework for improving an organization’s supply chain performance.

This SMA has been prepared to apply to any organization regardless of its type or size. This guideline will help financial professionals:

- understand all areas of supply chain management and its impact on the business and the organization;
- identify ways to take supply chain management to a more strategic level within the organization;
- develop a framework for planning and managing the implementation of ISCM;
- understand the roles and responsibilities of financial professionals in ISCM; and
- create a cost and performance system that provides management with the information needed to effectively deploy, coordinate, and control the activities of the supply chain.

III. DEFINING INTEGRATED SUPPLY CHAIN MANAGEMENT
The broadest visions of integrated supply chain management are usually expressed in terms of meeting the final customer’s product needs. At its core, ISCM involves coordinating the flow of physical goods from material sourcing, through manufacturing, to the points of consumption. As depicted in Exhibit 1, this entails the efficient management of information and funds flows associated with goods as they move along their overall value chain.¹

At one level, ISCM is concerned with strategic issues such as the integration of internal and external business processes, the development of close linkages between channel partners, and

¹ Value chain is a term that denotes a process consisting of a number of related steps, with each step adding a certain value to the total outcome.
the management of products and information as they move across organizational and enterprise boundaries.

On another level, ISCM can also be a tactical tool applied to the management of ongoing operational activities. These activities may include customer service, control of inbound and outbound flows of materials and information, and elimination of channel inefficiencies, costs, and redundancies extending from raw materials acquisition through manufacturing, distribution, consumption, and final return through the channel by way of recycling or disposal.

To a great extent, there is still a high degree of variability of personal opinion about what, exactly, ISCM means. These differing opinions often carry through to the extent that key people in the same organization are not talking about the same things when they discuss the concept of ISCM. Yet, to be competitive and to better serve the customer, companies know that they must improve their supply chain operations.

With an eye toward finding a common language, or at least some common ground, an array of manufacturers, software developers, and transportation companies collaborated to create the Supply Chain Operations Reference model (SCOR) illustrated in Exhibit 2. The SCOR model attempts to develop an objective framework for looking at an organization’s entire procurement and distribution network from the supplier’s supplier to the customer’s customer.

2 The SCOR model is the standard reference of all possible supply chain metrics, best practices, and supporting technologies. It was developed by the Supply Chain Council, a consortium meant to bring manufacturers from many different industries together to tackle documents of the baseline supply-chain processes shared by all. Information on this organization and the SCOR model can be found on the Council’s website: http://www.supply-chain.com.
The goal of SCOR is to provide organizations with common terminology, perspective, and benchmarks, first to describe and then to configure their supply chains. The SCOR model breaks down the supply chain into four key management processes: Plan, Source, Make, and Deliver.

- **Plan** encompasses processes that balance aggregate demand and supply to develop a course of action that meets a company’s preferred business rules. Plan activities include all aspects of demand/supply planning. Specific issues covered by Plan include assessing supply resources; aggregating and prioritizing demand requirements; planning inventory and distribution requirements; and assessing production, materials, and capacity for all products and all channels. Plan also involves managing the planning infrastructure, make-buy decisions, long-term capacity and resource planning, and business planning.

- **Source** encompasses processes that procure goods and services to meet planned and actual demand. It includes managing the sourcing infrastructure—i.e., vendor certification and feedback, component engineering, vendor contracts, and vendor payments.

- **Make** covers all processes that transform goods to a finished state to meet planned or actual demand. It includes managing the production execution activities, resources, and infrastructure.
Deliver incorporates all processes that provide finished goods and services to meet planned or actual demand. It includes order management, warehouse management, transportation, and installation management. Deliver involves managing the deliver infrastructure, channel business rules, order rules, deliver inventories, and deliver quality.

Exhibit 3 illustrates the core activities that fall under each of these four processes.

EXHIBIT 3. SCOR CORE ACTIVITIES

**PLAN INCLUDES:**
- Demand and supply planning
  - Assess supply resources
  - Aggregate and prioritize demand requirements
  - Plan inventory and distribution requirements
  - Plan production, material procurement, and capacity for all products and channels

**DELIVER INCLUDES:**
- Demand management
  - Forecasting
  - Sales campaigns and promotions planning
  - Project planning
  - Collecting and analyzing demand, including orders and POS data
  - Pricing
  - Measuring customer satisfaction
  - Executing efficient customer response (ECR)

**Order management**
- Enter and maintain orders
- Generate quotations
- Configure products
- Create and maintain customer orders
- Manage allocations
- Manage accounts receivable, credit, and collections

**Warehouse management**
- Receive and stock finished goods
- Pick and pack
- Kit configured products
- Ship products
- Create customer-specific labeling and packaging
- Consolidate orders for shipping

**Transportation management**
- Manage traffic
- Manage freight
- Coordinate import/export process

**Installation**
- Schedule and perform installation activities

**Make infrastructure**
- Channel business rules
- Order rules
- Manage Deliver inventories (finished goods)

**Source includes:**
- Sourcing
  - Vendor selection and contract negotiation
  - Ordering, receiving, inspecting, holding, and issuing material

**Make infrastructure**
- Implement engineering changes
- Facilities and equipment maintenance
- Production activity monitoring and control
- Quality assurance
- Production scheduling and capacity analysis

**Make infrastructure**
- Make buy decisions
- Supply chain configuration
- Long-term capacity and resource planning
- Business planning
- Product life-cycle management

**Source infrastructure**
- Vendor certification and performance monitoring
- Incoming quality assurance
- In-bound freight
- Component engineering
- Vendor payment processing

**Make infrastructure**
- Package and hold/release for shipping

**Make infrastructure**
- Production execution
  - Request and receive material
  - Manufacture and test product

**Make infrastructure**
- Package and hold/release for shipping

**Source infrastructure**
- Make buy decisions
  - Supply chain configuration
  - Long-term capacity and resource planning
  - Business planning
  - Product life-cycle management

**Make infrastructure**
- Make buy decisions
  - Supply chain configuration
  - Long-term capacity and resource planning
  - Business planning
  - Product life-cycle management

The four SCOR process categories are a very effective means, or common language, in which to document the intra- and interorganization supply chain. For example, by using the process icons, the relationships between functions, key suppliers, and major customers can be modeled and ultimately improved. Looking at Exhibit 4, the supply chain of a fictitious semiconductor manufacturer, it is easy to see that there are many planning processes; some of them could potentially be eliminated by passing demand.
Leading ISCM practitioners display certain common characteristics. For one, they focus intensely on actual customer demand. Instead of forcing product into the market that may or may not sell quickly (and thereby inviting high warehousing costs), they react to actual customer demand. And by doing so, these supply chain leaders minimize the flow of raw materials, finished product, and packaging materials at every point in the pipeline.

IV. STAGES OF SUPPLY CHAIN MANAGEMENT

Only a small percentage of manufacturers are on the leading edge of mainstream ISCM. Most companies range between implementing supply chain fundamentals and serious enterprise integration. Different industries and different organizations within each industry develop diverse supply chain management integration strategies, based on the customer segments to be served, the products and services offered, and the geographic locations involved. Exhibit 5 identifies a continuum of increasingly sophisticated stages of supply chain management.

EXHIBIT 4. USING SCOR TO DOCUMENT A SUPPLY CHAIN

Source: Supply Chain Council.
The stages of Supply Chain management include:

- **The fundamentals.** Basic tools such as spreadsheets are used to help ensure delivery of quality goods at a reasonable, predictable cost. Management focus is internal, built around independent departments, with a premium placed on achieving repeatable results through standard operating procedures and automation. Companies see their management mission in supply chain management only as controlling finished goods, transportation, and warehousing. They emphasize expediting today's workload above all.

- **Cross-functional teams.** Management focus is on consolidation at the operational level, bringing together people from manufacturing, logistics, and customer service to solve problems.

- **Integrated enterprise.** Management focus moves from consolidated operations to an integrated supply chain, at least internally. All enterprise functions, ranging from finance to logistics, as well as related business units composing the internal supply chain, are integrated to form the foundation of a unified business system. Achieving this objective requires not only the close synchronization of all daily operational and planning processes, but also the removal of departmental biases and the establishment of strategic congruence and consensus.

- **Extended supply chain.** Companies recognize the competitive advantage and the potential for profitable growth in extending integration to trading partners. As much as possible, functions throughout the supply chain are integrated to form the foundation of a unified value chain. In addition, mass customization of goods and services and finer segmentation of customer groups becomes the norm. To make this possible, there is interoperability within customer and supplier systems, even though they may involve different computing architectures, operating systems, applications, data definitions, and performance metrics.

The extended supply chain stage requires organizations to develop mutual, well-defined objectives, advanced negotiating skills, knowledge of critical business processes, and the ability to work and make decisions that span the operations of multiple channel partners. In addition, this stage requires organizations to create and empower effective intra-channel and inter-channel process teams. These process teams assume fundamental agreement of operational objectives both within individual organizations and between channel members.

- **Supply chain communities.** The capabilities and capacity for innovation found among individual organizations included in a supply chain are fused into a single competitive entity. Networks of preferred suppliers are created in this stage. When this occurs, a synchronized planning solution is in place along with a collaborative capability to connect operations with ever-changing sets of trading partners.

Implementing supply chain communities requires a significantly larger effort than that required in the four previous stages of supply chain management. Whereas previous stages focus on the operations side of supply chain management (order management, warehousing, and transportation), implementation of supply chain communities requires companies to search continuously for opportunities to create strategic initiatives with business partners. These strategic initiatives encourage co-evolution of radically new methods of providing customers with value. They merge complementary channel capabilities, joint development of whole new business processes and technologies, new forms of vertical integra-
tion and economies of scale, and leverage core competencies found within or among associated enterprises. This final stage requires a high level of cooperation among management and the workforce, a concise definition of objectives and process performance, a strong commitment of all organizations involved, and a superlative information network.

V. WHY IMPLEMENT ISCM?
Though there is general agreement that coordinating and integrating the flow of goods and services to market customers makes eminent business sense, most organizations have a difficult time assigning a quantitative payback figure to this exercise. This is really one of the biggest challenges facing supply chain professionals today. And yet, they need this kind of quantification to get management to invest in the development of ISCM. The most commonly reported bottom-line benefits center on reduced costs in such areas as inventory management, transportation, and warehousing and packaging, improved service through techniques such as time-based delivery and make-to-order, and enhanced revenues, which result from such supply chain related achievements as higher product availability and more customized products.

Research conducted by Mercer Management Consulting reveals that organizations with the best supply chains typically excel in certain piv-
otal performance areas. Specifically, they outperform their counterparts along such key metrics as reducing operating costs, improving asset productivity, and compressing order-cycle time. In a separate study, Mercer found that close to half of all senior executives surveyed had specific supply chain improvement projects among their top 10 corporate initiatives.

A study by the management consulting firm of A.T. Kearney has approached the supply chain payback from another angle—the costs of not paying careful attention to the supply chain process. The Kearney consultants found that supply chain inefficiencies could waste as much as 25 percent of an organization’s operating costs. Thus, assuming even a relatively low profit margin of 3 to 4 percent, a 5 percent reduction in supply chain waste could double an organization’s profitability.

Many organizations focus on the payback potential of specific activities within the total supply chain process. The following examples illustrate the kinds of benefits that can be realized. Individually, these improvements can bring important cost savings and service enhancements. Collectively, they can lead to dramatic breakthroughs in profitability and market share.

- **Distribution network optimization.** Optimizing the distribution network—that is, determining the best location for each facility, setting the proper system configuration, and selecting the right carriers—can bring immediate cost advantages of 20 to 30 percent. That’s the figure determined by IBM’s Wholesale Distribution Industry Segment, based on consulting engagements in a wide range of industries. This typically breaks down into transportation savings of 15 to 25 percent and improvements in inventory carrying costs of 10 to 15 percent.

- **Shipment consolidation.** A proven, though often overlooked, supply chain lever lies in shipment consolidation. Nabisco offers an instructive example in this regard. For one retail customer, the company had been delivering product from multiple plants via six different deliveries. Through the use of a third-party logistics provider, Nabisco was able to consolidate these multi-vendor loads into two truckloads. By strategically consolidating the shipments, Nabisco cut its transportation costs by half. On top of that, it reduced inventory levels, increased inventory turns, cut lead-times, improved on-time delivery, and enhanced case-fill rates.

- **Cross-docking.** Another supply chain technique with proven payback potential is cross-docking. This is the practice of receiving and processing goods for reshipping in the shortest time possible and with minimum handling and storage. Cross-docking can yield savings of 25 percent or more over conventional warehousing.

- **Supplier management.** Research from McKinsey & Co. demonstrates the substantial improvements possible through aggressive supply management. An article by McKinsey consultants in the Winter 1998 issue of *Supply Chain Management Review* mentions a client in the automotive industry that had successfully integrated vendors into its product-development process. On one particular team, the integration paid dividends in triplicate; the parts count dropped by 30 percent, the number of assembly steps and material specifications was reduced by half, and development time shrank from years to months.

- **Supplier integration.** The advantages of supplier integration were evident in a two-year study conducted by the Global Procurement and Supply Chain Initiative at Michigan State University. Drawing on responses received from around the globe, the study showed that
organizations that involved suppliers earlier on in the product-design and development process consistently outperformed those that did not. This was true across a range of supply management metrics. The comparative improvement in purchased material costs alone was 15 percent.

Supply chain management has become today’s most important concept for competitive advantage because it enables companies organized along a supply chain to exploit the new realities transforming the marketplace.

VI. THE ROLE OF MANAGEMENT ACCOUNTING

Because of the multiple processes and parties involved, implementing ISCM has to be a team effort. Visible in that team effort are financial professionals. The financial professional serves a vital role in providing data to operational managers, assessing the achieved versus planned benefits of new supply chain arrangements, monitoring economic factors, and providing basic internal control system support to ensure that participating organizations are adequately protected.

Moving beyond management support efforts, financial professionals also serve on natural and systems improvement work teams, providing economic insights, analytical support, and objective evaluation of current versus proposed systems. Specific roles and responsibilities of financial practitioners in ISCM include:

- providing current estimates of supply chain costs and performance against defined customer expectations;
- participating in analyzing proposed changes to ensure that economic factors are realistically portrayed;
- creating or supporting the creation of an ISCM business case(s) as the need arises;
- developing new measurements, both financial and nonfinancial, to assess the degree of improvement of the supply chain;
- providing management with timely reports that isolate current performance shortfalls;
- participating in natural systems improvement team efforts;
- supporting the design and development of effective, efficient integrated information systems;
- examining existing transactional systems to identify ways to reduce the costs or delays that reduce customer value, including instituting changes to the accounts payable effort within the order-to-payment system;
- developing “virtual control” systems to safeguard the integrity of company and supply chain databases, transactions, and flows; and
- supporting the development of new forms of incentives and reward systems to encourage active participation and cooperation of individuals across the organization in supply chain initiatives.

Building trust and commitment to ISCM begins with the attitudes and efforts of individuals throughout the participating organizations. It is crucial that the financial professional serve as a facilitator and supporter of the change from traditional to integrated supply chain systems.

While also bearing the responsibility for ensuring the data and financial integrity of the resulting ISCM structure and alliances, the financial professional should actively avoid taking on a “policeman” role in these initiatives. The ultimate success of the ISCM initiative depends on open communication, objective analysis, and continuous learning throughout the supply chain.
VII. ISCM IMPLEMENTATION STEPS

There is no “proven path” to implementing ISCM. There are so many operational and strategic facets to ISCM that any given implementation can take an infinite variety of forms, progress through radically different stages, and result in several different outcomes. However, broadly speaking, ISCM implementations should focus on these steps:

- assessing supply chain opportunities;
- developing an ISCM vision;
- developing an ISCM strategy;
- creating the optimum ISCM organizational structure;
- establishing the ISCM information and communication network; and
- translating the ISCM strategy into actions.

While organizations can modify the sequence and emphasis placed on these steps to meet the needs of a particular situation, these activities are recommended as a guide for implementing ISCM. These steps are illustrated in Exhibit 6.

Assessing Supply Chain Opportunities

Changing consumer demographics, the emergence of new distribution channels, the consolidation of trading partners, and the increasing use of computer and telecommunications technology are creating a changing environment for organizations. Each of these factors is producing new challenges and new supply chain opportunities.

An effective way to begin assessing supply chain opportunities is by forming an organization-wide steering committee that oversees all related project activities, challenges the basis of recommendations, and approves final recommendations and implementation plans. To spearhead the opportunity assessment effort, the creation of a supply chain assessment team that works under the aegis of the steering committee is recommended. The assessment team should comprise strong operations people who have a feeling for technology without being systems people per se. They should also have a knack for working with people in a project environment.
The focus of the assessment team must be on facts rather than guesswork or emotions. Several categories of information need to be gathered and analyzed including:

- competitiveness of the organization;
- consumer and trading partner preferences;
- the strength of the brand or the product line;
- the impact on production and logistics operations; and
- risks and rewards.

**Competitiveness of the Organization**

The assessment team’s first task is to determine the supply chain competitiveness of the organization. This evaluation begins with a comparison of business objectives against existing capabilities and performance. This exercise can reveal where the existing supply chain can achieve immediate competitive advantage and where inefficiencies may be leaving the company vulnerable to the competition.

The necessary knowledge to complete this assessment includes internal competencies and capabilities, the capability and capacity of supply partners, and the current and projected performance of key competitors.

**Consumer and Trading Partner Preferences**

An organization must understand the current and projected behavior of those who buy its products. This is normally achieved through interviews and other analysis. The knowledge gained from this effort is invaluable in assessing supply chain opportunities because the fit between a company’s distribution actions and the preferences of those who purchase its products ultimately determines success.

A major producer of home entertainment software is an example of a company that analyzed its consumer buying preferences well. Observing the occasionally ineffective in-store merchandizing of its products by existing distributors, the company reasoned that its strong brand identity could be leveraged much more powerfully if it asserted more direct control over this process. It discovered that in fact its brand was often the key factor in driving consumer buying behavior. Furthermore, the product was frequently an impulse purchase motivated by strong merchandizing programs and advertising campaigns.

The company saw a significant opportunity in taking control of its product in the retail stores of large mass merchants. And by doing so, the organization was able to acquire dedicated shelf space for its brand, merchandize its products more effectively, improve product availability and inventory control, and thereby improve sales and margins.

**Strength of the Brand or the Product Line**

Understanding the marketplace clout of an organization’s products is also important for assessing supply chain opportunities. If substitutes for a product or product line are readily available, the company must approach new supply chain opportunities more carefully than if its brand is dominant. Retailers that might willingly purchase the products through, for instance, direct sales from a manufacturer may balk at paying extra for the services of a middleman if substitutes are available from another manufacturer who direct ships.

**Impact on Production and Logistics Operations**

A supply chain opportunity may require complex and costly changes in current manufacturing and logistics operations, information systems, staff, and operations. An organization may find, in fact, that the advantages to be gained by pursuing a new or revamped supply chain strategy will not in the long run justify the significant investments...
needed. Rigorous analysis of these trade-offs is essential for success.

**Risks and Rewards**

Decision trees and what-if modeling are used to assess the value of potential strategies based on the probability of various combinations of events occurring: changing sales volumes, reaction of competition, changes in operating costs, and reaction of trading partners. The final output will be estimates of how the economics of the existing supply chain will be affected with the new strategy.

The final activity in calculating risks and rewards is to estimate one-time costs associated with each scenario being evaluated. These costs, which can be significant, may include those for new information systems, changes in plant and equipment, and other investments. With this additional information, a business case can be prepared for each scenario; it should include a cashflow analysis, statement of impact on shareholder value, and calculation of return on investment.

**Developing an ISCM Vision**

Step two in the implementation process is to create a vision of the desired supply chain. Visioning provides organizations with specific goals and strategies on how they plan to identify and realize the opportunities they expect to find in the marketplace. Supply chain visioning is most successful when it is customer focused, strategy driven, and outcome based. Specifically, the supply chain vision should be built from a clear understanding of customer needs and how well the existing supply chain is meeting those needs. Four critical dimensions to be included in formulating an ISCM vision are:

- sourcing;
- demand flow;
- customer service; and
- supply chain integration.

These objectives are achieved through careful analysis, collaboration, and communication among supply chain partners. Each dimension of the visioning process brings new perspective and progress toward these objectives.

**Sourcing**

Sourcing is the identification of potential trading partners who can meet both internal and external supply chain performance requirements. Sourcing can represent a major constraint or a major opportunity, depending on how open the organization is to “out of the box” solutions for meeting supply chain and customer needs. If a partner can be found that is willing to pool its resources within a trusting environment focused on continuous improvement, the capabilities of the trading units can be leveraged to maximize system performance against competitors. If no such partner can be identified, an organization is faced with the decision of making the item or discontinuing the initiative. Determining where plants and suppliers should be located, what capacity they should have available, and the best way to organize production and logistics flows all combine to shape the ISCM vision.

The chosen sources have to be willing to give up a part of their autonomy in return for the ability to participate with other organizations in the pursuit of superior service and the rewards it provides. All partners have to be willing to invest in the future of the supply chain relationship. For example, sourcing in ISCM is far more comprehensive than simply searching for a vendor with a low price and acceptable delivery and terms.

Wal-Mart is a company particularly well known for integrating its suppliers into a network respon-
sive to a defined vision of customer values. Driving its sourcing partners to a 72-hour schedule, with some items down to 24- or 48-hour response times, Wal-Mart uses a “rapid replenishment” vision to ensure that it has what customers want, when needed, with minimal in-store inventories. POS scanners and other technology enablers indicate current trends, inventory status, and replenishment needs on a real-time basis. JIT delivery can then be relied on to move merchandise where it is needed, when it is needed, and in the right quantity and quality required. Achieving customer responsiveness at Wal-Mart begins with choosing trading partners that can perform to expectations.

**Demand Flow**

The experience at Wal-Mart is also a sound example of the second key dimension of formulating an ISCM vision framework. Matching supply with consumption patterns greatly reduces the inventory, and hence cost, in the supply chain. Achieving this goal requires that the manufacturing system, along with the suppliers, distributors, and retailers that participate in the supply pipeline activities become linked through electronic and other means to eliminate buffers and queues, reduce lead times, and enhance flexibility.

The ISCM vision has to include both definitions of the core features of the demand flow pattern the supply chain is expected to match, given customer expectations, as well as a statement of how and when these improvements are to be gained. Three elements define the demand flow dimension: channel design, demand planning, and supply chain configuration, as illustrated in Exhibit 7. Since a variety of structures can be used to move product and services through to the end-user, it is important to explore options and make channel choices that will improve customer service and reduce costs.

Dupont offers a prime example. Prior to implementing supply chain management the company exported to Europe a chemical product that was difficult to manufacture. It needed to be warehoused in a special facility while tests were done to “characterize” its quality level. After that, it was warehoused near the port of exit,

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**EXHIBIT 7. ELEMENTS OF DEMAND FLOW STRATEGY**

- **Demand planning**
  - What level of production and inventory should be maintained to meet customer demand?

- **Demand flow strategy**
  - Channel design
    - What channel structure(s) meets customer expectations most profitably?
  - Supply chain configuration
    - What is the optimal number role, location, and linkage of each supply chain participant?

awaiting containerization. The ocean voyage followed, then warehousing in Europe, prior to further storage at the Dupont distribution center that would release final shipment to the customer. That kind of expensive retention of inventory had to be eliminated.

The solution to the problem involved focusing on the demand flow in the supply chain. Dupont improved the quality of the manufacturing process by making the product to customer specifications. That, in turn, enabled Dupont to load containers right at the plant and ship straight to port. The process demanded far greater cross-functional cooperation, but the results—more satisfied customers and $1 million in savings—proved the value of the strategy.

Customer Service
Having established a definition and vision of sourcing and demand flow that reflects the customers’ value preferences, attention turns to customer service value requirements. Gaining knowledge of customer expectations is a key factor that must be addressed before a vision for future ISCM performance can be fully developed.

Identifying customer service value requirements can be a complex task. Not only are the needs of every end customer different, but so are the needs of the chain of customers that constitute the supply pipeline. Developing service standards for these cross sections of the supply channel is a painstaking process that seeks to utilize “hard” measurements as well as less precise judgments of what the perception of service value means to each customer. A general approach that seeks to address these issues consists of the following process:

- **Segmenting the marketplace.** This is a preliminary activity meant to separate the supply channel’s customers into groups for the purpose of gaining relevant insights and market distinctions as a preliminary to customer value requirements identification. The process is iterative in nature; its results are designed to be reconsidered and revised as actual customer value demands are revealed.

- **Identifying customer expectations.** Once meaningful market segments have been identified, key customer service values found within each segment can be identified, isolated, and merged to form a comprehensive list. Attaining this information is not always easy. Some companies such as Ford Motor Company, Boise Cascade, and Baxter’s Hospital Supply Division are very explicit about their requirements and expectations, to the point of detailing the requirements in policy manuals and brochures. In other cases where requirements are unclear, customer input must be solicited through personal interviews, telephone and mail surveys, and marketing-type focus groups. A negative technique is to chart current performance and “noise levels” to determine requirements.

- **Benchmarking.** Besides actively seeking to identify service value from the customer, organizations can also employ competitive benchmarking. Benchmarking is a quality management method in which an organization compares its bundle of product and service offerings with those of its competition and with the “best of breed” in all industries. Whereas benchmarking will shed little light on what actual customer expectations are, the technique does provide ISCM efforts with objective standards and enables organizations to develop proactive approaches to identifying new sources of service value.

- **Ranking the importance of customer service value requirements.** Once a list of service value requirements has been compiled, it is important to rank each value in importance so
that the critical value requirements are readily visible. Delphi groups, rating scale methods, trade-off techniques, and computer analysis can be used effectively to develop a usable scale of service component elements. The goal is to compile a list detailing which service values are market winners and which are baseline values.

The metrics gathered from these approaches are critical in highlighting, for the entire supply channel, those service values that both the chain of customers and the end customers perceive as crucial. Applying management methods and technology tools to enhance these values and provide for new avenues of competitive advantage is the overlying goal of the process. The detailed measurements attained form the basis for the development of an effective customer service strategy.

Supply Chain Integration
This final dimension of the supply chain visioning effort emphasizes the integration of supply chain partners into a seamless, responsive whole. In fact, a supply chain must have one or more ingredients that bind the members together or the network will have little or no substance. The ISCM vision must ensure that everyone attached to or affected by the supply chain benefits from the chosen strategy, structure, vision, and performance objectives.

Benetton is among the leaders in developing and implementing an integrated supply chain vision that benefits all of its trading partners. Based on information on actual consumption in stores in American malls, this Italian producer and retail clothier is capable of directing replenishment orders directly to its production sites. Within one to two days a plain garment is dyed to the specific colors needed to restock each retail site, shipped, received, and placed back on display for other customers.

Several questions need to be addressed when creating an integration vision. First, the degree of supply chain integration needs to be determined. Different industries and organizations facing different customer segments, products and service availability, and geographic limits should be expected to develop and benefit from very different integration approaches.

A second issue in the integration vision is the type of integration to be pursued: information, decision, financial, and/or operational. Having decided what elements integration will incorporate, a decision must be made on the nature of the linkages. Should the linkages be physical or virtual? In complete integration, the partners share information, finances, operations, and decision making with each other, constantly reviewing and refocusing the supply chain as demand changes. The goals and strategies must provide mutual benefit, or the integration initiative will not succeed.

ISCM requires organizations and entire supply networks to rigorously investigate their channel processes to ensure that they are providing superlative customer service, effectively utilizing the productive competencies of every channel partner, and creating a basis for an unbeatable competitive advantage. Only by understanding what is currently done, how well existing supply chain performance meets customer needs, how existing performance compares to competitors’ efforts, and what changes can and should be made, can the benefits of ISCM be gained by the trading partners.

Developing an ISCM Strategy
Once the ISCM vision has been developed, atten-
tion turns toward creating a comprehensive value-added ISCM strategy. An ISCM strategy must create maximum economic value for the customer. It should also provide a win-win situation for both the manufacturer and value-adding channel participants, creating growth opportunities for each participant. The ultimate goal, to develop a trust-based relationship among all parties, is based on a system of mutual support, effort, and benefit.

ISCM strategies provide the basis for developing a clear direction for the supply chain that helps identify current levels of awareness and dedication to the underlying vision and objectives of the supply chain network. Second, expansion of the core supply chain strategy to reflect detailed channel strategies will provide the means to develop performance metrics, feedback, evaluation, and improvement initiatives.

World-class ISCM strategies are based on or incorporate many of the following principles of supply chain excellence:

- **Formulate a differentiated supply chain strategy.** For product categories, product channels, and target customers, organizations need an ISCM strategy that, when executed, makes their supply chain different from the rest.

- **Segment customers based on service needs.** Organizations have traditionally grouped customers by industry, product, or trade channel and then provided the same level of service to everyone within a segment. Effective supply chain strategies, by contrast, group customers by distinct service needs—regardless of industry—and then tailor services to those particular segments.

- **Customize the logistics network.** When developing a logistics strategy, organizations need to focus intensely on the service requirements and profitability of the customer segments identified. The conventional approach of creating a “monolithic” logistics network runs counter to successful supply chain management.

- **Organize business units around major processes, not functions.** Plan, source, make, deliver are more important processes than organizational functions, departments, or other traditional “silos” that separate work and interrupt flow. These processes must be customer-driven, efficient processes integrated with trading partners into seamless flow pipelines.

- **Outsource elements of the chain for higher performance.** In many cases, the operating functions of the supply chain can be performed better by third parties. Management time should be spent on innovations, new ways to excel, not on managing the mundane.

- **Differentiate product closer to the customer.** Organizations today no longer can afford to stockpile inventory to compensate for possible forecasting errors. Instead, they need to postpone product differentiation in the manufacturing process closer to actual consumer demand.

- **Develop a supply-chain-wide technology strategy.** As one of the cornerstones of successful ISCM, information technology must support multiple levels of decision making. It also should afford a clear view of the flow of products, services, and information.

- **Capture signals of market demand and plan accordingly.** Sales and operations planning must span the entire chain to detect early warning signals of changing demand in ordering patterns, customer promotions, and so forth. This demand-intensive approach leads to more consistent forecasts and optimal resource allocation.

- **Set clear guidelines for creating or terminating alliances with supply chain partners.** ISCM strategy clearly delineates which types of collaboration with partners must be pursued and
which must be avoided. Also, clearly established and mutually agreed-upon performance standards are established and adhered to, thereby empowering supply chain managers to terminate nonproductive or ineffective supply chain partnerships.

- Adopt channel-spanning performance measures. Excellent supply chain measurement systems do more than just monitor internal functions. They adopt measures that apply to every link in the supply chain. These measurement systems embrace both service and financial metrics, such as each account’s true profitability. They also adopt a common set of metrics that can be applied to and shared with all of the participants in the supply chain.

Creating the Optimum ISCM Organizational Structure

Once the ISCM strategy has been articulated and accepted, the next task is to define how the customers’ needs will be met at each stage of the supply pipeline, as well as who among the participants can best fulfill that need.

One school of thought is that each supply chain needs an anchor organization with almost dictatorial power to orchestrate the actions of trading partners. Others argue that many supply chains are too complex for a single trading partner to have a large impact, and that inter-organizational cooperation is required to make significant changes.

In support of the anchor organization, proponents point to the automobile industry’s implementation of JIT, which was initiated by the large assemblers and disseminated to the tier 1 suppliers. In turn, tier 1 suppliers shared this largess with the tier 2 suppliers and so on throughout the supply chain. As the anchor organization, automobile assemblers not only had the power to dictate the necessary changes for JIT among its suppliers but also forced its customers to buy cars made-to-demand rather than made-to-order. In other supply chains, large retailers such as Wal-Mart and Home Depot play the role of the anchor organization, demanding special packaging, pricing, delivery, and inventory practices.

To refute the argument for the anchor organization, proponents of this point of view present the argument that coerced improvements are difficult in supply chains that may have several large organizations, each of which may attempt to promote reengineering for their benefit at the expense of other trading partners. Some argue that this is what actually happened in the automobile industry. When pushed into JIT delivery schedules by the big three American automakers, equally powerful suppliers such as Goodyear, USX, and Allied-Signal found ways to stay profitable and flourish. Some of this came from operational improvements and some came from pushing back on the automakers by raising prices for their components. Despite dramatic operational improvements, the net result of all of this pushing and shoving among trading partners was a car that costs more than many consumers can afford.

In an investigation of the supply chain for simple stamped metal parts, one automaker discovered over $500 million of inventory at various suppliers being used to buffer the effects of mandatory JIT deliveries. Although there have been many improvements in the quality of cars as a result of the JIT/TQM efforts, the impact on the whole supply chain was not considered and the ultimate customer suffered. In light of the problems caused by some JIT edits, several automakers are now looking at the whole supply chain rather than just their immediate suppliers.
The role of each partner within an ISCM organizational structure cannot be static. As new customer segments are identified or new channels are developed to serve current customers, the network structure and the role of participating organizations will need to change. In some cases, new participants with new skills, such as electronic capability or global reach, may be recruited. If this is done, the entire network should be reconfigured to ensure effective integration of new with existing players and skills.

Effective ISCM organizational structures require several elements. To begin with, the internal structures of the organizations must be flat, provide for people empowerment, and be cross-disciplinary and cross-departmental. In addition, ISCM relies on the configuration and empowerment of cross-channel process teams targeted at achieving channel strategic objectives and continuously creating innovative sources of customer value. Within ISCM, interdependence and teamwork have to be built into the fiber of the participating organizations. Linked to each other through vision, strategy, structure, and operations, supply chain partners must earn and keep each other’s trust.

Optimization of the ISCM organizational structure requires an advanced form of partnering that relies on openness, communication, and the use of the best improvement tools and techniques available to gain the quantum performance enhancements required to create and sustain a competitive advantage. Some of the more beneficial approaches used to create ISCM organizational structures have been used by firms such as Corning, Allied Signal, and AT&T, including:

- Engineering and design talent is shared among trading partners, focusing on those projects and products that hold the greatest promise for mutual benefit. Joint design and development and assignment of joint resources to work through challenges and opportunities to isolate innovative and marketable solutions are part of this collaborative effort.
- Joint training sessions are led by the best available, most highly skilled trainer from among the participating units. The sessions are held to improve problem-solving skills, increase understanding and use of planning and scheduling tools, and carry out team-building exercises. Providing common skills, common languages, and common tools eases integration and speeds effective collaboration.
- Executive overviews are conducted jointly as the search for identifying leading practices that will benefit all the trading partners continues. Benchmarking and high-level briefings serve to ensure that the network remains responsive to changing conditions.
- Cross-organizational pilot tests of new ideas or products provide benefits both in lessons learned and problems avoided.
- Joint investments are made in specialized equipment or focused facilities that support the supply network.

Establishing the ISCM Information and Communication Network

The thread that draws channel partners together is a common objective and its communication. Information, and the tools and technologies that create it, provide the means to bridge organizational boundaries and support inter-organizational learning. The development of a robust information and communication network aids ISCM participants in achieving several critical supply chain requirements, as illustrated in Exhibit 8.

Several primary features define effective ISCM information and communication systems including:

- they are based on distributed open systems,
or “client/server” architectures that will allow business systems as well as personal computers to “talk” with one another;

- distributed relational database technology underlies the network structures allowing for ready access and transparent use by individuals and enterprises in any location;

- systems span inter-enterprise functional boundaries and enable the development and structuring of global channel-wide information networks, allowing companies to share information regarding customers, production, inventory, and finance with their supply chain partners; and

- these systems are able to process transactions from multiple organizations and infrastructures rapidly and accurately.

ISCM information and communication networks can be divided into the following three stages:

- **Transaction**al—electronic execution of transactions;
- **Information-sharing**—electronic sharing or exchange of information; and
- **Collaborative**—electronic collaboration on strategic, tactical, and operational planning.

### Transactional Stage

When most organizations discuss the growth in the use of computers to automate their business-to-business commerce with channel partners, they usually refer to the automation of such business transactions as:

- purchase orders and invoices;
- order and advanced shipment notices (ASNs);
- freight invoices and payments; and
- load tendering and acknowledgements.

These transactions involve the electronic transmission of a fixed-format document with predefined data and information fields. Traditionally,

#### Exhibit 8. Critical Supply Chain Requirements

<table>
<thead>
<tr>
<th>Business Drivers</th>
<th>Supply Chain Practices</th>
<th>Enabling Technologies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shorter product life cycles</td>
<td>Collaborative product development</td>
<td>Email and work group conferencing</td>
</tr>
<tr>
<td>Reducing costs</td>
<td>JIT, ECR, Quick Response, and continuous replenishment</td>
<td>Advanced warehouse and transportation management systems</td>
</tr>
<tr>
<td>Product proliferation</td>
<td>Deployment planning and vendor managed inventory</td>
<td>Point-of-sales data collection</td>
</tr>
<tr>
<td>Mass customization</td>
<td>Collaborative forecasting</td>
<td>Workflow</td>
</tr>
<tr>
<td>Thwart competition</td>
<td>Collaborative planning</td>
<td>Electronic messaging</td>
</tr>
<tr>
<td>Core competency focus</td>
<td>Schedule sharing</td>
<td>Advanced planning and scheduling</td>
</tr>
<tr>
<td>Meet/exceed customer service demands</td>
<td>Electronic commerce</td>
<td>EDI, the Internet and other private/public networks</td>
</tr>
<tr>
<td>The virtual enterprise</td>
<td>Competing supply chain threads</td>
<td>Cellular/RF/satellite communication and mobile computing</td>
</tr>
</tbody>
</table>

**ISCM** information and communication networks can be divided into the following three stages:
this has been the way EDI has been implemented. To facilitate commerce among a large body of buyers and sellers, industry-wide standards for documents have been established. In North America, the most commonly used standards are those established by the American National Standards Institute (ANSI). ANSI has created standard transaction sets or ANSI X.12 standards, which define document layout, as in the case of purchase orders. Outside North America, EDIFACT standards are most prevalent.

Under these standards, many companies use EDI to transmit operational and financial transactions over privately owned proprietary intranets or over commercial value-added networks (VAN).

As a result of the relatively high cost of VAN services, some small and medium-sized organizations are beginning to experiment using the Internet to transmit EDI transactions. This has prompted some VAN vendors to offer VAN-like services over the Internet.

EDI-based transactional relationships have grown dramatically over the last decade. Users find they can get almost immediate benefits from automating their supply chain execution activities. The use of EDI facilitates business transactions and reduces costs in a variety of ways including:

- reducing administrative efforts;
- making employees more productive;
- improving the accuracy of business transactions by reducing errors;
- reducing the paperwork transmitted between trading partners;
- speeding up transactional processes; and
- reducing the overall cost of doing business with trading partners.

These benefits are the result of automating traditionally manual transactional processes that involve a large number of buying and selling personnel. EDI allows computer-to-computer business transactions to occur without human input, enabling performance improvements in supply chain execution. However, these transactions do not improve supply chain planning. Within these relationships, the amount of shared information that is useful for planning purposes is negligible.

Information-Sharing Stage
Following the automation of buyer-seller EDT-based transactions, the next stage in ISCM information and communication networks involves information sharing or data exchange. It includes at least one of these arrangements:

- the partners are given access to a system that has the shared information in it; and
- one partner transmits shared information to the other partner.

Wal-Mart’s RetailLink System is an example of an information-sharing technology of the first type. The retailer allows its suppliers to have access to a database of store-level POS from which they can view and download information about their product sales.

Examples of data exchange partnerships of the second type come from the automotive industry. In this industry, certain first- and second-tier suppliers are sent a forecast of the original equipment manufacturer’s (OEM) material requirements, which they use to help schedule plant operations. In addition, some OEMs electronically transmit technical design and component specification information to their suppliers. Electronic catalogs represent another form of an information-sharing relationship in which manufacturers can view information about a supplier’s products.
Information-sharing relationships differ from collaborative relationships primarily in that information is sent on an “FYI” basis. The recipient is using the data as-is and is not providing feedback. Nevertheless, this information is helpful in improving supply chain performance. Examples of shared supply chain information include the following:

- Order status;
- Shipment tracking and tracing;
- Sales forecasts;
- Production schedules;
- Inventories, including raw materials, work-in-process, and finished goods;
- Product designs and specs;
- Product descriptions and pricing (e.g., electronic catalogs with online ordering); and
- Promotional calendars.

Information-sharing arrangements electronically support both supply chain planning and execution, thereby improving supply chain performance. Relative to planning, these arrangements only support independent planning done by each participant, rather than joint planning. Information-sharing relationships, however, help ensure that trading partners’ plans are as synchronized as much as possible. Through this arrangement, a partner effectively reduces uncertainty in its supply and demand situation by becoming aware of its partners’ activities—in lieu of having to predict or forecast them.

While information-sharing relationships enable supply chain synchronization, they do little to reduce the uncertainty faced by channel partners in determining future demand. Since the information shared from one partner to another is on an FYI basis only, there is no opportunity for the other partner to provide its own insight and knowledge of consumer needs. In addition, there is little opportunity to work together on matching supply with anticipated consumer demand.

**Collaborative Stage**

To further enhance their buyer-seller relationship, some channel partners are moving toward collaborative relationships. Collaborative is defined as “working jointly with others, especially in an intellectual endeavor.” Collaborative efforts enable channel partners to work together to better understand future demand.

For example, in the case of working collaboratively on consumer requirements, channel partners might work jointly on new product designs and consumer demand forecasts. Working collaboratively to match supply and demand might involve channel partners jointly deciding how many and when products will be produced to meet expected consumer demand. The types of planning that channel partners conduct collaboratively include:

- New product planning;
- Product design and technical specifications (e.g., via CAD drawings or files);
- Product packaging;
- Pricing;
- Promotional planning;
- Demand forecasting;
- Replenishment planning; and
- Store layout and shelf space planning.

Planning done on a collaborative basis by two channel partners will vary greatly by their function within a product’s supply chain. For example, collaborative store layout and shelf space planning would most likely only be done between a consumer goods manufacturer and a retailer, since other suppliers would have little knowledge of the subject. Several organizations have started working on forms of electronic collaboration or plan to do so. Most of these efforts involve information sharing leading to collaboration in
which partners jointly work on a forecast of demand to be expected by the seller.

For example, Whirlpool Corporation, a manufacturer of consumer appliances, started a joint forecasting program with some of its major customers. The program is an essential component of its effort to reengineer supply chain processes. Within this program a group of employees focuses on demand planning for Sears and other major channel partners. Each week these trading partners send Whirlpool a forecast of needs for the next 16 weeks at the stock keeping unit (SKU) level. Additional detailed information forecasted about the first three weeks is included. Whirlpool and its partners focus on this three-week forecast window because it is most affected by promotional programs, the major driver of demand variability.

Another example of supply chain collaboration involves Heineken USA, the U.S. distribution arm of the European beer manufacturer. This organization developed a system called the Heineken Operational Planning System (called HOPS) that enables the company to collaborate with its distributors on forecasts via the Internet. The system, with just a standard Internet browser, allows distributors to view a Heineken-generated demand forecast of their needs. A distributor can then refine or approve the forecast. Upon completion, Heineken’s distribution planning module creates a recommended replenishment order. This is modified or approved by the distributor and results in a purchase order against Heineken.

**Appointing a Process Owner**

ICSM is invariably about moving from a functional or subprocess orientation to one where supply chain management covers all functions and subprocesses across the entire supply chain network. Subprocess owners typically have neither the perspective nor influence to deal with this new environment. The change process involves managers defining who does what in the new environment. If these managers report to different functional heads, then the process of reaching consensus can be long and painful. Moreover, the complexity of achieving change across supply chain networks will lead to a higher occurrence of boundary issues, resource prioritization conflicts, and questions over the perceived need for change.

Without a single process owner coordinating the supply chain in total, change initiatives will result in optimized performance along functional lines without regard to the impact on the total system. Exhibit 9 identifies three supply chain process owner options for management to adopt in implementing IScM.
For example, Coca-Cola Schweppes is one of the many businesses that have appointed a supply chain process owner. SmithKline Beecham, a leader in ISCM in certain respects, combines production, distribution, and purchasing under one vice president, with sales, marketing, and planning under another. Xerox named a vice president of supply chain management, empowered to develop a strategy to cut inventory levels while boosting customer service.

Aligning Culture with Strategic Response

The failure to recognize the importance of, let alone achieve, strategic alignment is one main reason that ISCM implementations are not successful. Culture provides the internal fabric to deliver the business strategy. When mapped and understood, it can be a predictor of the likely success of implementing the ISCM strategy. Regardless of the strength of the logic for a strategic response, change is unlikely to be achieved unless there is alignment with the corporate culture. Logic will count for little if aspects of the existing culture are misaligned with and work directly against the change.

Achieving alignment, however, is a complex process. All the time the alignment is being sought, customers in the market are changing their behavior, the organization is trying to change its strategy, the different subcultures are resisting the change, and managers and leaders in the firm are trying to respond. For organizations attempting change across a number of cross-functional and cross-organizational or network interfaces, the complexities that arise in achieving cultural alignment are magnified many times. Of course, perfect alignment is an ideal

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**EXHIBIT 9. SUPPLY CHAIN PROCESS OWNER OPTIONS**

<table>
<thead>
<tr>
<th>Role</th>
<th>Pros</th>
<th>Cons</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supply chain director</td>
<td>Direct control of operations and change programs&lt;br&gt;Tension between functions can be resolved quickly</td>
<td>Introduces another management layer&lt;br&gt;Decreases regional/customer focus through centralization</td>
</tr>
<tr>
<td>Supply chain change program manager</td>
<td>Focus on developing future supply chain capabilities&lt;br&gt;Defines processes to ensure integration between functions</td>
<td>No coordination of day-to-day activities&lt;br&gt;Difficulties in building consensus for different regions/functions</td>
</tr>
<tr>
<td>Supply chain planner</td>
<td>Creates consistent plan across supply chain and forum for resolving issues&lt;br&gt;Maintains regional/functional autonomy</td>
<td>No real responsibility for operations and lacks authority&lt;br&gt;No focus for supply chain strategy and/or change program</td>
</tr>
</tbody>
</table>

state, continually sought but rarely achieved. The key task for the organization is to understand and manage the interdependencies that exist among the situation, strategy, culture, and leadership style in implementing change. Achieving closer alignment among them will always result in more effective performance than if no actions are taken.

Culture has profound implications for achieving a new ISCM response, but in many ways it is like an iceberg. Above the surface lies only the tip of the iceberg: the rules, structures, behavior patterns, rituals, and style are relatively easily changed. But nothing can be further from the truth, because just as the bulk of an iceberg lies hidden beneath the surface so, too, the real essence or core of the company’s culture lies hidden.

Attitudes, values, beliefs, and assumptions about the company underlie the observable behaviors and structures. The invisibility of these underlying variables means that their decisive impact on how the organization thinks and behaves is often not even considered in the process of understanding a strategic initiative, yet they act as an invisible barrier to change.

The larger and more diverse or complex an organization, the more difficult changing the culture will be. The complexity of supply chain change requires an array of intra- and inter-organizational subcultures to be considered and bought into alignment along the supply chain. Each of the subcultures will have differing goals, priorities, beliefs, standards, and values driving behavior. Areas of clashes or inconsistency will have to be negotiated, although working through fundamental differences takes time and energy.

Organizations need to address two prerequisites to alignment. First, the mandate for change must be based on alignment with the market and customer base; that is, the organization must have studied its market and know where it is heading. Second, companies must know what they are or what their culture is; this is normally achieved through mapping their culture. The mapping exercise identifies the changes and refinements on critical dimensions that need to be made to optimize implementation of the desired strategic response. Once the gap has been recognized, the organization must be redesigned to support the cultures or values and behaviors of the new organizational state. Identifying the gap between current and target states also provides the basis for altering performance measures, training people and improving their skills, or retrenching and recruiting others.

Reengineering Critical Business Processes
Many organizations understand the need to change employees’ attitudes toward the business as being critical to the ISCM implementation process. And yet, many organizations trying to implement supply chain management have approached it as an automation of existing processes and practices, rather than recognizing it as the need to “reinvent the business” to take full advantage and reap the full benefit of the new way of doing the work.

Complete ISCM integration can be difficult without significant process reengineering. Without an active attempt to “break down the functional walls” within the organization, or between organizations, the best information technology tools in the world will be useless. The power of these tools is that they offer a new way of looking at the business, a “one number system” that allows all departments (or independent members of the supply chain) to work according to the same plan. If participants persist in following their old ways of doing things and keep function-
al walls intact, then the benefits of the new tools will soon be lost.

Measuring Performance

Measuring performance is an integral component of ISCM throughout the planning, implementation, and execution phases of the process. Evaluating each element in the total supply chain allows important trade-off decisions to be made and focuses attention on eliminating nonvalue-added processes. ISCM should be cost justified initially and on an ongoing basis. Performance should be measured with each ISCM relationship. Each organization needs to develop financial evaluations specific to its own methods and cost structures. The measurement of ISCM typically falls into three categories:

- financial impact of ISCM;
- internal performance measurements; and
- external satisfaction/quality measures.

While all three are interdependent (e.g., increased quality should result in increased sales), separating key measures helps organizations identify the impact of ISCM on their different functional areas, for example:

- marketing may want to understand the likely impact on customer/consumer satisfaction;
- distribution may be more interested in internal performance measures; and
- finance may require financial measures to assess capital requests for new technology.

Many organizations neglect to create effective measurements across their business. For example, often the measure of quality in one organization location is not the same as in another. Similarly, measures of customer service in one location are not the same as those at other locations. Within many firms, people are still using apples and oranges comparisons when they look at performance to customers or performance to suppliers. Many of their measurements are also historically oriented rather than driving toward desired outcomes. Many organizations still need to put forward target measures in place. How all these things are put together varies from industry to industry and organization to organization.

Developing and Training the Workforce

Education is critical at every step of an ISCM implementation effort. In the initial stages of the execution phase, the focus of development should be on those key individuals who, by virtue of their personal and/or positional power, have the ability to change the organization by applying leverage at the key pressure points. These change leaders have the positional power to make or break the transmission of key aspects of the program.

In ISCM implementations, change leaders are often logistics or supply chain professionals who can be called on to make rapid, complex decisions; coordinate action across multiple product, geographic, functional, and organizational interfaces; and interact with and manage several rapidly forming teams. Since few logisticians are either trained or experienced to manage true business integration, people used to leverage key pressure points across the supply chain should be developed, at a minimum, in the following four areas:

- Group and workshop facilitation skills. Specific training in facilitating workshops and leading discussions in the areas requiring change will enable managers to elicit ideas and responses from staff, confidently involve their people in the change process, and make presentations to senior management.
- Organizational behavior and change skills. Since key individuals will act as change agents, they would benefit greatly from knowledge of the techniques and theories of organizational
behavior and change. Understanding the psychology of change and even a little about organizational behavior will help prepare them for the specific interventions that may be used to shift the organization toward its desired state.

- **Cross-cultural communication skills.** Where change spans international boundaries or workforces with differing cultural composition, key individuals would benefit from insights into the behaviors and perceptions between the cultures in question that might lead to misunderstanding or that could be leveraged to help reach the ISCM goals.

- **Leadership and performance management skills.** Key supply chain agents require skills that enable them to influence, motivate, and manage personnel around them and form functions and organizations different from their norm. These skills are necessary to move people from existing positions toward the change goal, to generate confidence that the changes are in the organization’s and their own best interests, and to monitor and manage the extent of movement of people toward the change goals.

All affected employees will require some form of training and development to enable them to achieve new performance targets. Supply chain change often results in process redesign that requires workers to carry out new tasks and interact with different people. For example, a person who previously just took customer orders may now be required to check inventory, check credit, confirm the order, and handle many product types. Carefully crafted training programs are required that allow the worker to understand the new job, its performance objectives, new systems, tools, and techniques.

### Involving Stakeholders and Gaining Commitment to Change

Resistance to change is a natural human response; it will occur. People resist change more when it is imposed on them. The question, therefore, is how best to involve ISCM stakeholders in a meaningful way. While gaining involvement can be complex and very time consuming at the outset, doing so is one of the best ways to alleviate the unnecessary fear and uncertainty that often lead to resistance.

Involving people affected by the upcoming change assists in building commitment toward and ownership of the ISCM goals. If people are involved, it sends a powerful message that things will be different and employees are playing an important role in making the difference. If they are not involved from the outset they feel left out and unfairly treated. Target dates may be jeopardized and the chances of success will be significantly reduced.

ISCM implementations are replete with examples of change programs that have failed through not giving adequate attention and time to involving stakeholders in defining the change content. In one important supply chain project in a major consumer goods company, for example, the change effort stopped after a successful first phase but before any benefits could be realized. Failure occurred because:

- local managers were not committed to the change;
- a policy of secrecy suppressed rather than overcame resistance;
- a short-term focus resulted in lack of involvement; and
- current high levels of profitability meant that there was no clear imperative for change.
Identifying all stakeholders is also a critical pre-condition for successful ISCM change management. ISCM projects must identify all stakeholder groups so that their fears, expectations, and needs can be addressed.

Implementing a System to Track Benefits
Developing and using a system to monitor the success of the ISCM change program, as well as to track the benefits reaped, is important to:

- ensure that the progress to date and planned actions will still achieve the business benefits;
- provide early feedback to stakeholders that will reassure those funding the project, motivate those engaged in the program, and quiet the skeptics and cynics who may otherwise undermine the change; and
- provide feedback to senior management so that further refinements can be made to program plans.

The ISCM cost/benefit impact report illustrated in Exhibit 10 can be used by organizations in...
determining their ISCM objectives, the financial impact, and the impact on their customers.

The ISCM benefits tracking system must be linked to the budgeting process so that the business benefits are reflected in the targets of operational managers. Links also need to be created to the product-pricing and customer-profitability monitoring systems. Strategic change will deliver improved margins by affecting both revenue and costs. Actively managing the pricing decision as it relates to new services and key customer segments is essential to achieving the expected benefits. This is particularly important in implementing ISCM because, despite all the focus on partnerships and win-win relationships, the benefits of change (or its value) are rarely distributed evenly across the companies participating in the change process.

Communicating with All Stakeholders
Rumor and distrust can undermine any ISCM implementation. Communication, particularly from top management down, must be a continuous process, conducted in an honest, effective, and open manner, so that people understand in advance what is required of them. Successful ISCM implementation programs are characterized by constant, frank, and timely communication to all stakeholders.

For example, to get the word out about its supply chain management, Nabisco distributes to about 300 key employees a quarterly four-page newsletter called “Logistics Systems of the 90’s.” It uses plain language to explain how the product supply channel works and the responsibilities of each area in the chain.

While implementing ISCM, communication is also required across company boundaries between suppliers, customers, and other organizations in the chain. Also, the investment community in publicly traded organizations must not be ignored. These other parties are affected differently than internal employees, and they require radically different messages using different means of communication. For example, some organizations involve several full-time people from their public relations group to manage external communications throughout the ISCM implementation.

Creating an Integration Map
It is essential to create a map of organizational or supply-chain-wide initiatives and compare them with the organization’s goals, performance measures, and resources. By its nature, ISCM implementation will lead to a multiplicity of programs springing up across the supply chain. This, together with the array of other change programs that might exist among stakeholder groups, provides a recipe for confusion and potential failure.

The integration map is a mechanism for identifying the array of change initiatives and programs ongoing within an organization or the existing supply chain, as well as for revealing conflicting time, resource priorities, and change goals that have not been addressed. The map proves useful in helping to decide which projects to launch first and which may need to be jettisoned. Since concurrent conflicting initiatives often lead to confusion, action taken to integrate initiatives is essential if the ISCM implementation is to be successful.

VIII. CONCLUSION
As we approach the 21st century, one thing becomes strikingly clear: Supply-chain management is not just the wave of the future. It is a tsunami that will engulf everything in its path, that resists every attempt to stockpile inventory, to push product blindly into the market, to
respond slowly (or not at all) to changing customer demands, to handle business transactions on paper.

For financial professionals and others working in this field, the issue is not so much whether to become expert in the art and science of supply chain management but rather, how fast. This means becoming intimately familiar with the corporate mission and figuring out how logistics can help achieve that mission.

Perhaps the most important mandate of all is to get closer to customers. Supply chain management in a very literal sense begins and ends with customers. Knowing what they want, when they want it, and speedily delivering the goods—in a nutshell, that is what supply chain management is all about.

GLOSSARY

AUTOMOTIVE NETWORK EXCHANGE (ANX). The Auto Industry Action Group (AIAG) is developing an Internet-based Extranet called the Automotive Network Exchange, supported by the Big Three North American automobile makers. The intent of this large-scale, ambitious system is to allow automobile makers and component/subassembly suppliers to exchange information electronically. This information will include:
- e-mail;
- production schedules;
- CAD files; and
- EDI-based transactions (e.g., material releases and ASNs).

The plans for ANX also include the potential for distributing interactive applications such as electronic maintenance, repair, and operational (MRO) catalogs and groupware. The ANX system, while initially focused on enabling Automotive OEM/supplier communications, could eventually connect 40,000 manufacturers, suppliers, dealerships, and financial services organizations.

COMPUTER-ASSISTED ORDERING (CSO). A retail-based system that automatically generates replenishment orders when the shelf inventory drops below a predetermined level. The computer system tracks the inventory of all items in the store, adjusting for receipts and sales.

CONTINUOUS REPLENISHMENT. Seeks to move products more efficiently throughout the supply chain, reducing waste, time, and inventory costs.

CONTINUOUS REPLENISHMENT PROGRAM (CRP). A program in which a supplier takes on the inventory control responsibility for managing inventories at its customer’s locations, with the customer maintaining responsibility for inventory planning activities such as setting target inventory levels. CRP is the practice of partnering among distribution channel members that changes the traditional replenishment process from distributor-generated purchase orders to one based on actual forecasted consumer demand.

CROSS-DOCKING. A distribution system in which merchandise received at the warehouse or distribution center is not put away but instead is readied for shipment to retail stores. Cross-docking requires close synchronization of all inbound and outbound shipments.

DEMAND ACTIVATED MANUFACTURING ARCHITECTURE (DAMA). Created in 1993, the demand activated manufacturing architecture project is part of the American Textile Partnership. DAMA’s mission is to research, pilot, and make prototypes of concepts aimed at integrating the U.S. Integrated Textile Complex (ITC). ITC comprises the
fiber, textile, apparel, and retail industries. The project, funded by U.S. government agencies and ITC companies, focuses on developing technology infrastructure components to enable supply chain collaboration.

**ELECTRONIC DATA INTERCHANGE (EDT).** The computer-to-computer transmission of business information between trading partners. The information is usually organized in standard file formats or transaction sets.

**OPEN SYSTEM.** Technology conforming to general system standards offering users a wider selection of software programs. They facilitate computer systems linkage and the use of multiple vendors.

**POINT-OF-SALE (POS).** The place where the purchase is made at the checkout stand or scanning terminals in a retail store. However, the acronym POS frequently is used to describe the sales data generated at the checkout scanners.

**QUICK RESPONSE (QR).** A program in which apparel and general merchandisers work together using point-of-sale (POS) data to help coordinate the flow of goods from manufacturing to retail shelves.

**VALUE-ADDED NETWORKS (VAN).** A company that acts as a clearinghouse for electronic transactions between trading partners.

**BIBLIOGRAPHY**


