DEFINING SUPPLY CHAIN MANAGEMENT

by

John T. Mentzer
The University of Tennessee

William DeWitt
The University of Maryland

James S. Keebler
St. Cloud State University

Soonhong Min
Georgia Southern University

Nancy W. Nix
Texas Christian University

Carlo D. Smith
The University of San Diego

and

Zach G. Zacharia
Texas Christian University

"Management is on the verge of a major breakthrough in understanding how industrial company success depends on the interactions between the flows of information, materials, money, manpower, and capital equipment. The way these five flow systems interlock to amplify one another and to cause change and fluctuation will form the basis for anticipating the effects of decisions, policies, organizational forms, and investment choices." (Forrester 1958, p. 37)

Forrester introduced a theory of distribution management that recognized the integrated nature of organizational relationships. Because organizations are so intertwined, he argued that system dynamics can influence the performance of functions such as research, engineering, sales, and promotion.

He illustrated this phenomena utilizing a computer simulation of order information flow and its influence on production and distribution performance for each supply chain member, as well as the entire supply chain system. More recent replications of this phenomenon include the "Beer Game" simulation and research covering the "Bullwhip Effect" (Lee, Padmanabhan, and Whang 1997).

Discussing the shape of the future, Forrester (1958, p. 52) proposed that after a period of research and development involving basic analytic techniques, "there will come general recognition of the advantage enjoyed by the pioneering management who have been the first to improve their understanding of the interrelationships between separate company functions and between the company and its markets, its industry, and the national economy." Though his article is more than forty years old, it appears that Forrester identified key management issues and illustrated the dynamics of factors associated with the phenomenon referred to in contemporary business literature as Supply Chain Management (SCM).

The term supply chain management has risen to prominence over the past ten years (Cooper et al. 1997). For example, at the 1995 Annual Conference of the Council of Logistics Management, 13.5% of the concurrent session titles contained the words "supply chain." At the 1997 conference, just two years later, the number of sessions containing the term rose to 22.4%. Moreover, the term is frequently used to describe executive responsibilities in corporations (La Londe 1997). SCM has become such a "hot topic" that it is difficult to pick up a periodical on manufacturing, distribution, marketing, customer management, or transportation without seeing an article about SCM or SCM-related topics (Ross 1998).

There are many reasons for the popularity of the concept. Specific drivers may be traced to trends in global sourcing, an emphasis on time and quality-based competition, and their respective contributions to greater environmental uncertainty. Corporations have turned increasingly to global sources for their supplies. This globalization of supply has forced companies to look for more effective ways to coordinate the flow of materials into and out of the company. Key to such coordination is an orientation toward closer relationships with suppliers. Further, companies in particular and supply chains in general compete more today on the basis of time and quality. Getting a defect-free product to the customer faster and more reliably than the competition is no longer seen as a competitive advantage, but simply a requirement to be in the market. Customers are demanding products consistently delivered faster, exactly on time, and with no damage. Each of these necessitates closer coordination with suppliers and distributors. This global orientation and increased performance-based competition, combined with rapidly changing technology and economic conditions, all contribute to marketplace uncertainty. This uncertainty requires greater flexibility on the part of individual companies and supply chains, which in turn demands more flexibility in supply chain relationships.

Despite the popularity of the term Supply Chain Management, both in academia and practice, there remains considerable confusion as to its meaning. Some authors define SCM in operational terms involving the flow of materials and products, some view it as a management philosophy, and some view it in terms of a management process (Tyndall et al. 1998). Authors have even conceptualized SCM differently within the same article: as a form of integrated system between vertical integration

and separate identities on one hand, and as a management philosophy on the other hand (Cooper and Ellram 1993).

Such ambiguity suggests a need to examine the phenomena of SCM more closely in order to clearly define the term and concept, to identify those factors that contribute to effective SCM, and to suggest how the adoption of a SCM approach can affect corporate strategy and performance. The purpose of this paper is to examine the existing research in an effort to understand the concept of "supply chain management." Various definitions of SCM and "supply chain" are reviewed, categorized, and synthesized. Definitions of supporting constructs of SCM and a framework are then offered to establish a consistent means to conceptualize SCM. Antecedents and consequences of SCM are identified, and the boundaries of SCM in terms of business functions and organizations are proposed. A conceptual model and definition of SCM are then presented that indicate the nature, antecedents, and consequences of the phenomena. The model is accompanied by a series of managerial and research implications.

WHAT IS SUPPLY CHAIN MANAGEMENT?

It has been noted that discussions of SCM often use complicated terminology, thus limiting management's understanding of the concept and its effectiveness for practical application (Ross 1998). This section is, thus, dedicated to reviewing, classifying, and synthesizing some of the widely-used definitions of "supply chain" and "supply chain management" in both academia and practice. The goal of this discussion is the development of one, comprehensive definition upon which managers and future researchers can build.

Defining the Supply Chain

The definition of "supply chain" seems to be more common across authors than the definition of "supply chain management" (Cooper and Ellram 1993; La Londe and Masters 1994; Lambert, Stock, and Ellram 1998). La Londe and Masters proposed that a supply chain is a set of firms that pass materials forward. Normally, several independent firms are involved in manufacturing a product and placing it in the hands of the end user in a supply chain—raw material and component producers, product assemblers, wholesalers, retailer merchants and transportation companies are all members of a supply chain (La Londe and Masters 1994). By the same token, Lambert, Stock, and Ellram define a supply chain as the alignment of firms that brings products or services to market. Note that these concepts of supply chain include the final consumer as part of the supply chain.

Another definition notes a supply chain is the network of organizations that are involved, through upstream and downstream linkages, in the different processes and activities that produce value in the form of products and services delivered to the ultimate consumer (Christopher 1992). In other words, a supply chain consists of multiple firms, both upstream (i.e., supply) and downstream (i.e., distribution), and the ultimate consumer.

Given these definitions, for the purposes of this paper, a **supply chain** is defined as *a set of three or more entities (organizations or individuals) directly involved in the upstream and downstream flows of products, services, finances, and/or information from a source to a customer.*

Encompassed within this definition, we can identify three degrees of supply chain complexity: a "direct supply chain," an "extended supply chain," and an "ultimate supply chain." A direct supply chain consists of a company, a supplier, and a customer involved in the upstream and/or downstream flows of products, services, finances, and/or information (Figure 1a). An extended supply chain includes suppliers of the immediate supplier and customers of the immediate customer, all involved in the upstream and/or downstream flows of products, services, finances, and/or information (Figure 1b). An ultimate supply chain includes all the organizations involved in all the upstream and downstream flows of products, services, finances, and information from the ultimate supplier to the ultimate customer.

Figure 1c illustrates the complexity that ultimate supply chains can reach. In this example, a third party financial provider may be providing financing, assuming some of the risk, and offering financial advice; a third party logistics (3PL) provider is performing the logistics activities between two of the companies; and a market research firm is providing information about the ultimate customer to a company well back up the supply chain. This very briefly illustrates some of the many functions that complex supply chains can and do perform.

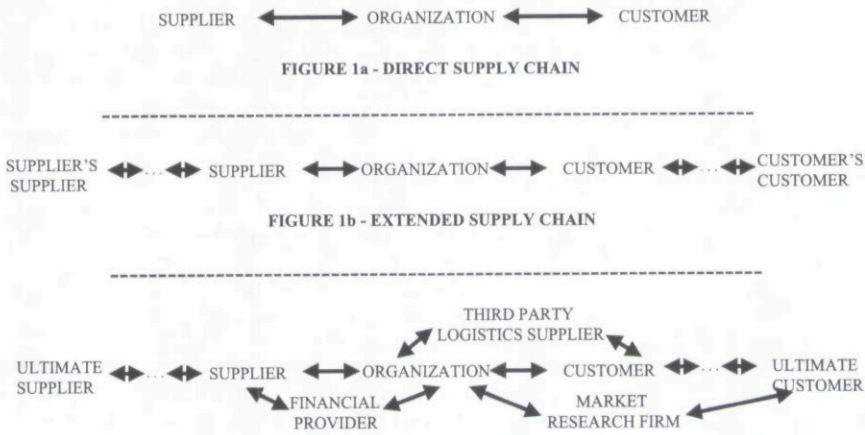
Although we will address this point in greater depth later in this paper, it is important to realize that implicit within these definitions is the fact that supply chains exist whether they are managed or not. If none of the organizations in Figure 1 actively implements any of the concepts discussed in this paper to manage the supply chain, the supply chain—as a phenomenon of business—still exists. Thus, we draw a definite distinction between **supply chains** as phenomena that exist in business and the **management of those supply chains.** The former is simply something that exists (often also referred to as distribution channels), while the latter requires overt management efforts by the organizations within the supply chain.

Given the potential for countless alternative supply chain configurations, it is important to note that any one organization can be part of numerous supply chains. Wal-Mart, for example, can be part of the supply chain for candy, for clothing, for hardware, and for many other products. This multiple supply chain phenomenon begins to explain the network nature that many supply chains possess. For example, AT&T might find Motorola to be a customer in one supply chain, a partner in another, a supplier in a third, and a competitor in still a fourth supply chain.

Note also that within our definition of supply chain, the final consumer is considered a member of the supply chain. This point is important because it recognizes that retailers such as Wal-Mart can be part of the upstream and downstream flows that constitute a supply chain.

FIGURE 1

TYPES OF CHANNEL RELATIONSHIPS



Definitions of Supply Chain Management

Although definitions of SCM differ across authors (see Table 1 for a representative sample), they can be classified into three categories: a management philosophy, implementation of a management philosophy, and a set of management processes. The alternative definitions and the categories they represent suggest that the term "supply chain management" presents a source of confusion for those involved in researching the phenomena, as well as those attempting to establish a supply chain approach to management. Research and practice would be improved if a single definition were adopted.

TABLE 1

DEFINITIONS OF SUPPLY CHAIN MANAGEMENT

Monczka, Trent, and Handfield (1998)	SCM requires traditionally separate materials functions to report to an executive responsible for coordinating the entire materials process, and also requires joint relationships with suppliers across multiple tiers. SCM is a concept, "whose primary objective is to integrate and manage the sourcing, flow, and control of materials using a total systems perspective across multiple functions and multiple tiers of suppliers."
La Londe and Masters (1994)	Supply chain strategy includes: "... two or more firms in a supply chain entering into a long-term agreement; ... the development of trust and commitment to the relationship; ... the integration of logistics activities involving the sharing of demand and sales data; ... the potential for a shift in the locus of control of the logistics process."
Stevens (1989)	"The objective of managing the supply chain is to synchronize the requirements of the customer with the flow of materials from suppliers in order to effect a balance between what are often seen as conflicting goals of high customer service, low inventory management, and low unit cost."
Houlihan (1988)	Differences between supply chain management and classical materials and manufacturing control: "1) The supply chain is viewed as a single process. Responsibility for the various segments in the chain is not fragmented and relegated to functional areas such as manufacturing, purchasing, distribution, and sales. 2) Supply chain management calls for, and in the end depends on, strategic decision making. "Supply" is a shared objective of practically every function in the chain and is of particular strategic significance because of its impact on overall costs and market share. 3) Supply chain management calls for a different perspective on inventories which are used as a balancing mechanism of last, not first, resort. 4) A new approach to systems is required—integration rather than interfacing."
Jones and Riley (1985)	"Supply chain management deals with the total flow of materials from suppliers through end users..."
Cooper et al. (1997)	Supply chain management is "... an integrative philosophy to manage the total flow of a distribution channel from supplier to the ultimate user."

SCM as a Management Philosophy

As a philosophy, SCM takes a systems approach to viewing the supply chain as a single entity, rather than as a set of fragmented parts, each performing its own function (Ellram and Cooper 1990; Houlihan 1988; Tyndall et al. 1998). In other words, the philosophy of supply chain management extends the concept of partnerships into a multifirm effort to manage the total flow of goods from the supplier to the ultimate customer (Ellram 1990; Jones and Riley 1985). Thus, SCM is a set of beliefs that each firm in the supply chain directly and indirectly affects the performance of all the other supply chain members, as well as ultimate, overall supply chain performance (Cooper et al. 1997).

SCM as a management philosophy seeks synchronization and convergence of intrafirm and interfirm operational and strategic capabilities into a unified, compelling marketplace force (Ross 1998). SCM as an integrative philosophy directs supply chain members to focus on developing innovative solutions to create unique, individualized sources of customer value. Langley and Holcomb (1992) suggest that the objective of SCM should be the synchronization of all supply chain activities to create customer value. Thus, SCM philosophy suggests the boundaries of SCM include not only logistics but also all other functions within a firm and within a supply chain to create customer value and satisfaction. In this context, understanding customers' values and requirements is essential (Ellram and Cooper 1990; Tyndall et al. 1998). In other words, SCM philosophy drives supply chain members to have a customer orientation.

Based upon the literature review, it is proposed that SCM as a management philosophy has the following characteristics:

1. A systems approach to viewing the supply chain as a whole, and to managing the total flow of goods inventory from the supplier to the ultimate customer;
2. A strategic orientation toward cooperative efforts to synchronize and converge intrafirm and interfirm operational and strategic capabilities into a unified whole; and
3. A customer focus to create unique and individualized sources of customer value, leading to customer satisfaction.

SCM as a Set of Activities to Implement a Management Philosophy

In adopting a supply chain management philosophy, firms must establish management practices that permit them to act or behave consistently with the philosophy. As such, many authors have focused on the activities that constitute supply chain management. This previous research has suggested various activities necessary to successfully implement a SCM philosophy (see Table 2).

TABLE 2

SCM ACTIVITIES

1. Integrated Behavior
2. Mutually Sharing Information
3. Mutually Sharing Risks and Rewards
4. Cooperation
5. The Same Goal and the Same Focus on Serving Customers
6. Integration of Processes
7. Partners to Build and Maintain Long-Term Relationships

Bowersox and Closs (1996) argued that to be fully effective in today's competitive environment, firms must expand their **integrated behavior** to incorporate customers and suppliers. This extension of integrated behaviors, through external integration, is referred to by Bowersox and Closs as supply chain management. In this context, the philosophy of SCM turns into the implementation of supply chain management: a set of activities that carries out the philosophy. This set of activities is a coordinated effort called supply chain management between the supply chain partners, such as suppliers, carriers, and manufacturers, to dynamically respond to the needs of the end customer (Greene 1991).

Related to integrated behavior, **mutually sharing information** among supply chain members is required to implement a SCM philosophy, especially for planning and monitoring processes (Cooper et al. 1997; Cooper, Lambert, and Pagh 1997; Ellram and Cooper 1990; Novack, Langley, and Rinehart 1995; Tyndall et al. 1998). Cooper, Lambert, and Pagh emphasized frequent information updating among the chain members for effective supply chain management. The Global Logistics Research Team at Michigan State University (1995) defines information sharing as the willingness to make strategic and tactical data available to other members of the supply chain. Open sharing of information such as inventory levels, forecasts, sales promotion strategies, and marketing strategies reduces the uncertainty between supply partners and results in enhanced performance (Andel 1997; Lewis and Talalayevsky 1997; Lusch and Brown 1996; Salcedo and Grackin 2000).

Effective SCM also requires **mutually sharing risks and rewards** that yield a competitive advantage (Cooper and Ellram 1993). Risk and reward sharing should happen over the long term (Cooper et al. 1997). Risk and reward sharing is important for long-term focus and cooperation among the supply chain members (Cooper et al. 1997; Cooper, Lambert, and Pagh 1997; Ellram and Cooper 1990; Novack, Langley, and Rinehart 1995; Tyndall et al. 1998).

Cooperation among the supply chain members is required for effective SCM (Ellram and Cooper 1990; Tyndall et al. 1998). Cooperation refers to similar or complementary, coordinated

activities performed by firms in a business relationship to produce superior mutual outcomes or singular outcomes that are mutually expected over time (Anderson and Narus 1990). Cooperation is not limited to the needs of the current transaction and happens at several management levels (e.g., both top and operational managers), involving cross-functional coordination across the supply chain members (Cooper et al. 1997).

Joint action in close relationships refers to carrying out the focal activities in a cooperative or coordinated way (Heide and John 1990). Cooperation starts with joint planning and ends with joint control activities to evaluate performance of the supply chain members, as well as the supply chain as a whole (Cooper et al. 1997; Cooper, Lambert, and Pagh 1997; Ellram and Cooper 1990; Novack, Langley, and Rinehart 1995; Spekman 1988; Tyndall et al. 1998). Joint planning and evaluation involve ongoing processes over multiple years (Cooper et al. 1997). In addition to planning and control, cooperation is needed to reduce supply chain inventories and pursue supply chain-wide cost efficiencies (Cooper et al. 1997; Dowst 1988). Furthermore, supply chain members should work together on new product development and product portfolio decisions (Drozdowski 1986). Finally, design of quality control and delivery systems is also a joint action (Treleven 1987).

La Londe and Masters proposed that a supply chain succeeds if all the members of the supply chain have **the same goal and the same focus on serving customers.** Establishing the same goal and the same focus among supply chain members is a form of policy integration. Lassar and Zinn (1995) suggested that successful relationships aim to integrate supply chain policy to avoid redundancy and overlap, while seeking a level of cooperation that allows participants to be more effective at lower cost levels. Policy integration is possible if there are compatible cultures and management techniques among the supply chain members.

The implementation of SCM needs the **integration of processes** from sourcing, to manufacturing, and to distribution across the supply chain (Cooper et al. 1997; Cooper, Lambert, and Pagh 1997; Ellram and Cooper 1990; Novack, Langley, and Rinehart 1995; Tyndall et al. 1998). Integration can be accomplished through cross-functional teams, in-plant supplier personnel, and third party service providers (Cooper et al. 1997; Cooper, Lambert, and Pagh 1997; Ellram and Cooper 1990; Manrodt, Holcomb, and Thompson 1997; Novack, Langley, and Rinehart 1995; Tyndall et al. 1998).

Stevens (1989) identified four stages of supply chain integration and discussed the planning and operating implications of each stage:

Stage 1) Represents the base line case. The supply chain is a function of fragmented operations within the individual company and is characterized by staged inventories, independent and incompatible control systems and procedures, and functional segregation.

Stage 2) Begins to focus internal integration, characterized by an emphasis on cost reduction rather than performance improvement, buffer inventory, initial evaluations of internal trade-offs, and reactive customer service.

Stage 3) Reaches toward internal corporate integration and characterized by full visibility of purchasing through distribution, medium-term planning, tactical rather than strategic focus, emphasis on efficiency, extended use of electronics support for linkages, and a continued reactive approach to customers.

Stage 4) Achieves supply chain integration by extending the scope of integration outside the company to embrace suppliers and customers.

Effective SCM is made up of a series of partnerships and, thus, SCM requires **partners to build and maintain long-term relationships** (Cooper et al. 1997; Ellram and Cooper 1990; Tyndall et al. 1998). Cooper et al. believe the relationship time horizon extends beyond the life of the contract—perhaps indefinitely—and, at the same time, the number of partners should be small to facilitate increased cooperation.

Gentry and Vellenga (1996) argue that it is not usual that all of the primary activities in a chain—inbound and outbound logistics, operations, marketing, sales, and service—will be performed by any one firm to maximize customer value. Thus, forming strategic alliances with supply chain partners such as suppliers, customers, or intermediaries (e.g., transportation and/or warehousing services) provides competitive advantage through creating customer value (Langley and Holcomb 1992).

SCM as a Set of Management Processes

As opposed to a focus on the activities that constitute supply chain management, other authors have focused on management processes. Davenport (1993) defines processes as a structured and measured set of activities designed to produce specific output for a particular customer or market. La Londe proposes that SCM is the process of managing relationships, information, and materials flow across enterprise borders to deliver enhanced customer service and economic value through synchronized management of the flow of physical goods and associated information from sourcing to consumption. Ross defines supply chain process as the actual physical business functions, institutions, and operations that characterize the way a particular supply chain moves goods and services to market through the supply pipeline. In other words, a process is a specific ordering of work activities across time and place, with a beginning, an end, clearly identified inputs and outputs, and a structure for action (Cooper et al. 1997; Cooper, Lambert, and Pagh 1997; Ellram and Cooper 1990; Novack, Langley, and Rinehart 1995; Tyndall et al. 1998).

Lambert, Stock, and Ellram (1998) propose that, to successfully implement SCM, all firms within a supply chain must overcome their own functional silos and adopt a process approach. Thus, all the functions within a supply chain are reorganized as key processes. The critical differences between the traditional functions and the process approach are that the focus of every process is on meeting the customer's requirements and that the firm is organized around these processes (Cooper et al. 1997; Cooper, Lambert, and Pagh 1997; Ellram and Cooper 1990; Novack, Langley, and Rinehart 1995; Tyndall et al. 1998). Lambert, Stock, and Ellram suggest the key processes typically include customer

relationship management, customer service management, demand management, order fulfillment, manufacturing flow management, procurement, and product development and commercialization.

SUPPLY CHAIN MANAGEMENT VERSUS SUPPLY CHAIN ORIENTATION

Although these perspectives on defining supply chain management are helpful, a careful examination of them indicates the literature is actually trying to define two concepts with one term, i.e., supply chain management. The idea of viewing the coordination of a supply chain from an overall system perspective, with each of the tactical activities of distribution flows seen within a broader strategic context (what has been called SCM as a management philosophy) is more accurately called a **Supply Chain Orientation.** The actual implementation of this orientation, across various companies in the supply chain, is more appropriately called Supply Chain Management.

This perspective leads us to the definition of one of these crucial constructs. **Supply Chain Orientation** is defined *as the recognition by an organization of the systemic, strategic implications of the tactical activities involved in managing the various flows in a supply chain.* Thus, a company possesses a supply chain orientation (SCO) if its management can see the implications of managing the upstream and downstream flows of products, services, finances, and information across their suppliers and their customers. From this definition, a company does not have a supply chain orientation if it only sees the systemic, strategic implications in one direction. Thus, in Figure 1a, the company in the middle of the direct supply chain may have a SCO, but the two companies on the ends do not (because the supplier is only focused down the supply chain—an historical "channels" orientation—and the customer is only focused up the supply chain—an historical "procurement" orientation).

Further, this does not mean the firm with the SCO can implement it—such implementation requires a SCO across several companies directly connected in the supply chain. The firm with the SCO may implement individual, disjointed supply chain tactics (such as Just-In-Time delivery, or Electronic Data Interchange with suppliers and customers), but this is not Supply Chain Management unless they are coordinated (a strategic orientation) over the supply chain (a systemic orientation).

The implementation of a SCO requires several companies in the supply chain to utilize the processes discussed in the previous section to realize the activities listed in Table 2. Supply Chain Management is the implementation of a supply chain orientation across suppliers and customers. Companies implementing SCM must first have a supply chain orientation. In the extended supply chain in Figure 1b, all of the companies involved have a supply chain orientation, except the first supplier and the last customer. Since the first supplier is only focused on its customer and since the last customer is only focused on its supplier, neither can be said to have an upstream and downstream orientation.

In other words, a Supply Chain Orientation is a management philosophy, and Supply Chain Management is the sum total of all the overt management actions undertaken to realize that philosophy. This leads us closer to understanding and defining Supply Chain Management. However, before we

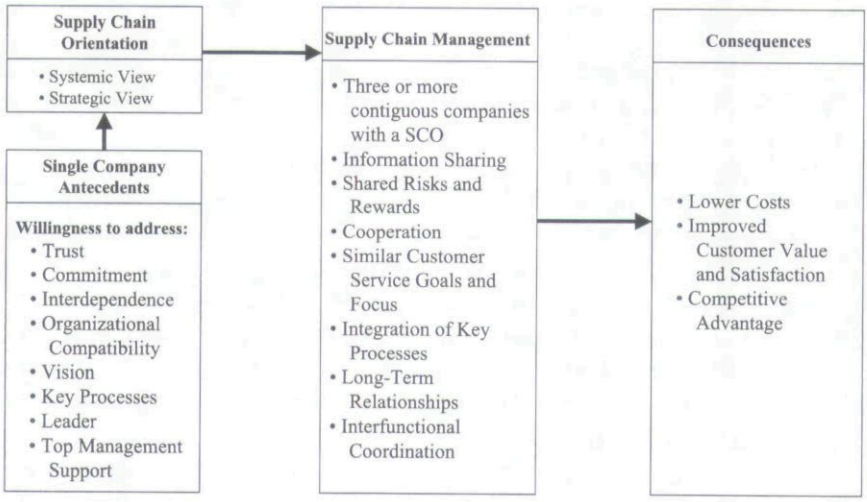
can fully accomplish this, we must also examine the antecedents and consequences, and the scope, of supply chain management.

ANTECEDENTS AND CONSEQUENCES

Since supply chain relationships are typically long-term and require considerable strategic coordination, we examine the antecedents and consequences of supply chain management at the strategic level (see Figure 2).

FIGURE 2

SUPPLY CHAIN MANAGEMENT ANTECEDENTS AND CONSEQUENCES



Antecedents to SCO and SCM

Antecedents to SCM are the factors that enhance or impede the implementation of a SCO philosophy. Morgan and Hunt (1994) propose that cooperation arises directly from both relationship trust and commitment. Moorman, Deshpande, and Zaltman (1993) define **trust** as a willingness to rely on an exchange partner in whom one has confidence. Though both trust and commitment are essential to make cooperation work, trust is a major determinant of relationship commitment (Achrol 1991). Thus, trust has both direct and indirect relationships with cooperation. Dwyer, Schurr, and Oh (1987) emphasize the role of trust to overcome mutual difficulties such as power, conflict, and

lower profitability. Therefore, it is proposed that trust has an effect on the sharing of risks and rewards.

Dwyer, Schurr, and Oh define commitment as "an implicit or explicit pledge of relational continuity between exchange partners." **Commitment** is an essential ingredient for the successful long-term relationships that are a component of the implementation of SCM (Gundlach, Achrol, and Mentzer 1995). Lambert, Stock, and Ellram also point out that the necessary commitment of resources and empowerment to achieve stated goals is important to implement SCM.

Putting together the effects of trust and commitment, Morgan and Hunt state, "Commitment and trust are 'key' because they encourage marketers to (1) work at preserving relationship investments by cooperating with exchange partners, (2) resist attractive short-term alternatives in favor of the expected long-term benefits of staying with existing partners, and (3) view potentially high-risk actions as prudent because of the belief that their partners will not act opportunistically." As such, trust and commitment lead directly to cooperative behaviors in the implementation of a SCO across several companies to achieve SCM.

The mutual dependence of a firm on a partner **(interdependence)** refers to the firm's need to maintain a relationship with the partner to achieve its goals (Frazier 1983). Acknowledged dependence is a prime force in the development of supply chain solidarity (Bowersox and Closs 1996). In addition, this dependence is what motivates willingness to negotiate functional transfer, share key information, and participate in joint operational planning (Bowersox and Closs 1996). Finally, Ganesan (1994) proposes that dependence of a firm on another firm is positively related to the firm's long-term relationship orientation.

Corporate philosophy or culture and the management techniques of each firm in a supply chain should be compatible for successful SCM (Cooper et al. 1997; Cooper, Lambert, and Pagh 1997; Ellram and Cooper 1990; Lambert, Stock, and Ellram 1998; Novack, Langley, and Rinehart 1995; Tyndall et al. 1998). **Organizational compatibility** is defined as complementary goals and objectives, as well as similarity in operating philosophies and corporate cultures (Bucklin and Sengupta 1993). Bucklin and Sengupta demonstrated that organizational compatibility between the firms in an alliance has a strong positive impact on the effectiveness of the relationship (i.e., the perception that the relationship is productive and worthwhile). Cooper, Lambert, and Pagh also argue that the importance of corporate culture and its compatibility across supply chain members cannot be underestimated. Given our earlier definition of SCO, organizational compatibility in a supply chain means that companies must *all have* a SCO to achieve SCM.

Lambert, Stock, and Ellram suggest there should be an agreement on SCM **vision** and **key processes.** Ross contends that the creation and communication of a market-winning competitive SCM vision shared not just by individual firms but also by the whole supply chain (SCO, by our definition) is essential before any SCM project can begin, i.e., its existence precedes (or antecedes) SCM. Visioning provides firms with specific goals and strategies on how they plan to identify and realize

the opportunities they expect to find in the marketplace (Ross 1998). The key processes will be addressed in greater depth in the section on the Functional Scope of SCM.

In terms of power and leadership structure of a supply chain, there needs to be a firm that assumes the **leader** role (Lambert, Stock, and Ellram 1998). Bowersox and Closs (1996) argue supply chains need leaders as much as individual organizations. Ellram and Cooper propose that a supply chain leader is like a channel captain in the marketing channels literature (e.g., Stern and El-Ansary (1988)) and plays a key role in coordinating and overseeing the whole supply chain. Bowersox and Closs suggest that, in many situations, a specific firm may function as a supply chain leader as a result of their size, economic power, customer patronage, comprehensive trade franchise, or the initiation of the inter-firm relationships.

Research confirms the fact that the success of supply chain management is directly correlated to the presence of constructive leadership capable of stimulating cooperative behavior between participating firms (Schmitz, Frankel, and Frayer 1994). However, forced participation by a strong supply chain leader will encourage exit behavior if the opportunity exists (Cooper et al. 1997; Cooper, Lambert, and Pagh 1997; Ellram and Cooper 1990; Novack, Langley, and Rinehart 1995; Tyndall et al. 1998).

Finally, several authors suggest **top management support** plays a critical role in shaping an organization's values, orientation, and direction (Felton 1959; Hambrick and Mason 1984; Kotter 1990; Tosti and Jackson 1990; Webster 1988). Day and Lord (1988) found that top-level managers have a substantial impact on organizational performance. Lambert, Stock, and Ellram suggest top management support, leadership, and commitment to change are important antecedents to the implementation of SCM. In the same context, Loforte (1991) contends lack of top management support is a barrier to SCM. In Figure 2, the recognition of the importance of these antecedents by a particular company is represented as antecedent to a SCO. When contiguous companies in a supply chain each achieve a SCO, they can begin the implementation process to realize SCM. In other words, SCO is a willingness by one company to address the issues listed in Figure 2 from a strategic, systemic perspective. Management of the supply chain is only accomplished when several companies in line in the supply chain have that orientation and move toward implementing the management philosophy of SCO.

An analogy may help at this time. A supply chain is much like a river, with products and services flowing down it instead of water. Whether anyone recognizes the systemic, strategic implications of managing the water basin, the river still exists. Similarly, whether any company recognizes the systemic, strategic implications of the supply chain of which they are a part, it still exists. When one state through which the river flows recognizes the need for states above it in the water basin to conserve and preserve the water supply <u>and</u> recognizes its own need to do the same for states below it, the state has taken a systemic strategic orientation—the river equivalent of a supply chain orientation. However, without the cooperation of the states above and below it, there is little it can do about implementing this orientation. It is only when a number of continuous states adopt such a similar orientation and actively manage the resources of the river that we can say the water basin is managed. Similarly, supply

chain management can only result in a managed supply chain when several companies directly linked in the supply chain have a SCO and actively manage to that orientation.

Consequences of SCM

The motive behind the formation of a supply chain arrangement is to increase supply chain competitive advantage (Global Logistics Research Team at Michigan State University 1995; Monczka, Trent, and Handfield 1998). Porter (1985) defines two types of competitive advantage: cost leadership and differentiation. According to Giunipero and Brand (1996), improving a firm's competitive advantage and profitability through SCM can be accomplished by enhancing overall customer satisfaction. By the same token, La Londe (1997) proposed that SCM aims at delivering enhanced customer service and economic value through synchronized management of the flow of physical goods and associated information from sourcing to consumption. According to Porter, competitive advantage grows fundamentally out of the customer value a firm creates, and aims to establish a profitable and sustainable position against the forces that determine industry competition. Thus, it is proposed that the implementation of SCM enhances customer value and satisfaction, which in turn leads to enhanced competitive advantage for the supply chain, as well as each member firm. This, ultimately, improves the profitability of the supply chain and its members.

Specific objectives to improve profitability, competitive advantage, and customer value/satisfaction of a supply chain, as well as its participants, are suggested by several researchers. For example, a key objective of SCM is to lower the costs required to provide the necessary level of customer service to a specific segment (Houlihan 1988; Jones and Riley 1985; Stevens 1989). The other key objective is to improve customer service through increased stock availability and reduced order cycle time (Cooper and Ellram 1993). Customer service objectives are also accomplished through a customer-enriching supply system focused on developing innovative solutions and synchronizing the flow of products, services, and information to create unique, individualized sources of customer service value (Ross 1998). Finally, low cost and differentiated service help build a competitive advantage for the supply chain (Cavinato 1992; Cooper et al. 1997; Cooper and Ellram 1993; Cooper, Lambert, and Pagh 1997; Ellram and Cooper 1990; Lee and Billington 1992; Novack, Langley, and Rinehart 1995; Tyndall et al. 1998). As such, SCM is concerned with improving both efficiency (i.e., cost reduction) and effectiveness (i.e., customer service) in a strategic context (i.e., creating customer value and satisfaction through integrated supply chain management) to obtain competitive advantage that ultimately brings profitability.

If we distinguish between the operational function of customer service and the resultant goal of customer value and satisfaction, this discussion leads us to conclude the consequences of SCM are lower costs and improved customer value and satisfaction to achieve competitive advantage. Industry reports support this contention (Performance Management Group 2001).

SCOPE

The scope of SCM is functional and organizational. The functional scope of SCM refers to which traditional business functions are included or excluded in the implementation and the process of SCM. The organizational scope of SCM concerns what kinds of inter-firm relationships are relevant to the participating firms in the implementation and the process of SCM.

Functional Scope of SCM

Since process refers to the combination of a particular set of functions to get a specific output, all of the traditional business functions should be included in the process of SCM. The supply chain concept originated in the logistics literature, and logistics has continued to have a significant impact on the SCM concept (Bowersox, Carter, and Monczka 1985; Dwyer, Schurr, and Oh 1987; Jones and Riley 1985; Monczka, Trent, and Handfield 1998). In this context, Tyndall et al. (1998) propose that "SCM logistics" is the art of managing the flow of materials and products from source to user. SCM—or the logistics system— includes the total flow of materials, from the acquisition of raw materials to delivery of finished products to the ultimate users, as well as the related counter-flows of information that both control and record material movement.

According to Lambert, Stock, and Ellram (1998), however, there exist important differences between the definition of supply chain management and the Council of Logistics Management's (1985) definition of logistics: "Logistics is the process of planning, implementing and controlling the efficient flow and storage of raw materials, in-process inventory, finished goods, services, and related information from point of origin to point of consumption (including inbound, outbound, internal and external movements) for the purpose of conforming to customer requirements." CLM (1998) apparently agreed, since its new definition states, "Logistics is *that part of the supply chain process* that plans, implements, and controls the efficient flow and storage of goods, services, and related information from the point of origin to the point of consumption in order to meet customers' requirements" (emphasis added). Thus, CLM has also distinguished between logistics and supply chain management, and acknowledged that logistics is *one of the functions* contained within supply chain management.

Ross explains that the role of logistics spans from warehousing and transportation to integrating the logistics operations of the entire supply chain, whereas SCM merges marketing and manufacturing with distribution functions to provide the enterprise with new sources of competitive advantage (Ross 1998). Logistics puts more emphasis on efficient movement and storage to fulfill customer requirements. Customer value and satisfaction that help a supply chain improve competitive advantage and profitability, however, require more than logistics (Giunipero and Brand 1996).

Thus, Cooper, Lambert, and Pagh (1997) argued SCM is more comprehensive than logistics so that SCM means the management of multiple business processes, including logistics processes. Marketing research, promotion, sales, information gathering, research and development, product

design, new product development, and total systems/value analysis should also be included (Bechtel and Jayaram 1997; Bowersox 1997; Ellram and Cooper 1990; Mentzer 1993; Tyndall et al. 1998).

We can conclude that the functional scope of SCM encompasses all the traditional intra-business functions, and these will be addressed more fully in the later discussion of Figure 3.

Organizational Scope of SCM

According to Christopher (1992), leading-edge companies have realized the real competition is not company against company, but rather supply chain against supply chain. Cooper, Lambert, and Pagh argue that organizational relationships tie firms to each other and may tie their success to the supply chain as a whole. In this context, a supply chain as a whole may have its own identity and function like an independent firm. However, to accomplish this ultimate supply chain, all companies in the supply chain must have a supply chain orientation. The result is a fully managed supply chain.

Ellram and Cooper suggest that effective supply chain management is made up of a series of partnerships among firms working together and mutually sharing information, risks, and rewards that yield a competitive advantage. In the same article, Ellram and Cooper also contend the successful supply chain relies on forming strategic partnerships with long-term orientations. Christopher suggests a network of organizations, through upstream and downstream linkages, as the organization for SCM.

According to Webster (1992), networks are the complex, multifaceted organizational structures that result from multiple strategic alliances. Thus, it is proposed that a network is a well-recognized organization for SCM. The basic characteristic of a network organization is a confederation— a loose and flexible coalition guided from a hub where the key functions include development and management of the alliances themselves, coordination of financial resources and technology, definition and management of core competencies and strategies, development of relationships with customers, and management of information resources that bind the network (Webster 1992).

From this discussion, and given our earlier definition of supply chains, we see the organizational scope of SCM as the implementation and process of SCM across three or more companies, all of which must have a SCO. This implementation and process must also include the systemic, strategic management of the activities listed in Table 2. This organizational scope is illustrated in the Supply Chain Management box of Figure 2.

DEFINING SUPPLY CHAIN MANAGEMENT

In this paper, issues and facets concerning the definitions of supply chain management—as well as the supply chain, the antecedents and consequences of SCM, and the boundaries of SCM— were discussed. The relationships between all these are illustrated in Figure 2.

Although, historically, the term supply chain management has a number of definitions, we believe it is possible to develop a single, encompassing definition of SCM. Reviewing the literature illustrated that supply chain management involves multiple firms, multiple business activities, and the coordination of those activities across functions and across firms in the supply chain. Pulling

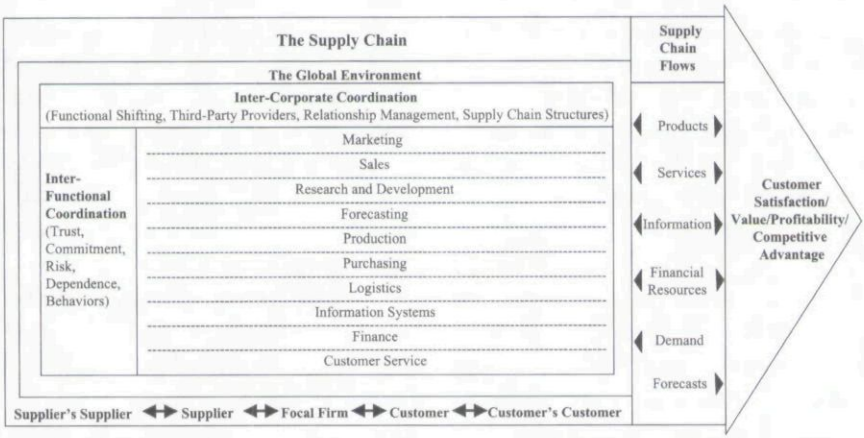
together these disparate aspects of supply chain management, for the purposes of this paper, **supply chain management** is defined as *the systemic, strategic coordination of the traditional business functions and the tactics across these business functions within a particular company and across businesses within the supply chain, for the purposes of improving the long-term performance of the individual companies and the supply chain as a whole.*

This definition implies much about the management of a supply chain, and led to the development of the conceptual model illustrated in Figure 3. A supply chain can be pictured as a pipeline, with Figure 3 illustrating a view of the pipeline from the side, showing directional supply chain flows (products, services, financial resources, the information associated with these flows, and the informational flows of demand and forecasts). The traditional business functions of marketing, sales, research and development, forecasting, production, procurement, logistics, information technology, finance, and customer service manage and accomplish these flows from the supplier's suppliers through the customer's customers to ultimately provide value and satisfy the customer. Figure 3 also shows the critical role of customer value and satisfaction to achieve competitive advantage and profitability for the individual companies in the supply chain, and the supply chain as a whole.

To fully examine this definition and model, the role of individual business functions, and how they are coordinated *across functions* and *across companies*, should be examined. Inter-functional coordination includes an examination of the roles of trust, commitment, risk, and dependence on the viability of internal functional sharing and coordination. Inter-corporate coordination includes functional shifting within the supply chain, the role of various types of third party providers, how relationships between companies should be managed, and the viability of different supply chain structures. Finally, how all these phenomena vary in different global settings is relevant and, thus, represented in Figure 3.

FIGURE 3

A MODEL OF SUPPLY CHAIN MANAGEMENT



CONCLUSIONS

There are several contributions of this paper to the knowledge of supply chain management. First, it provides an integrative framework of the phenomenon called SCM. As such, it should help practitioners as well as researchers understand SCM, give guidance to what SCM is, its prerequisites, and potential effects on business and supply chain performance. Without a clear understanding of SCM, we cannot expect wide application of SCM in practice or research.

Thus, the frameworks in Figures 2 and 3 have considerable applicability for practitioners. Figure 2 provides guidance as to the preconditions that need to be in place in order for a company to implement supply chain management with its suppliers and customers. Figure 3 should serve as a guide and reminder to practitioners to include all the typical business functions in supply chain management planning, organization, and processes. Without such inter-functional coordination, supply chain management cannot achieve its full potential. The same can be said for including all the supply chain flows in any supply chain management planning, organization, or process. Figure 3 also reminds managers that we do not live in a domestic world—most supply chains are global in some respect and should be managed as such. Finally, Figure 3 reminds practitioners to stay focused on the ultimate goals of supply chain management—lower costs, increased customer value and satisfaction, and ultimately competitive advantage.

For researchers, Figure 3 provides a wealth of research questions to investigate. What is the role of each of the various business functions in supply chain management? Do these roles shift depend-

ing on the company's position in the supply chain? How can these functions be effectively coordinated within a company and across the supply chain? The flows presented in Figure 3 also raise the question of who in the supply chain should best manage each of these flows—in other words, should there be a single supply chain leader or does this leadership role shift for different types of flows. If the latter, what conditions lead to the shifting of this flow-related leadership role? In addition, the long-term performance impacts of SCM need to be examined. Finally, the area of global supply chains provides many opportunities for research into the phenomenon of supply chains, SCO, and SCM. Do the antecedents and nature of SCM presented in Figure 2 change under and across different national cultures? How does supply chain management itself change across different global regions and across different types of companies? Does the management of inter-functional coordination and inter-corporate coordination change under these same cultural variations? These provide fascinating avenues for future research.

This paper also highlights the need for rigor to further develop a theoretical framework of SCM. In addition to the research questions suggested by Figure 3, testing the antecedent, phenomenon, and consequence structure of Figure 2 would tell us much about the structure of supply chains and supply chain management.

Related to this research question is the interesting research question: How prevalent is supply chain management? Much is written about supply chain management, but no research has been published that benchmarks the degree of SCO and SCM, and the conditions under which both exist. Such benchmarking research is clearly needed at this point in the exploration of supply chain management, and the constructs and relationships proposed in Figures 2 and 3 are intended to guide this research.

NOTES

Achrol, Ravi S. (1991), "Evolution of the Marketing Organization: New Forms for Dynamic Environments," *Journal of Marketing*, Vol. 55, October, pp. 77-93.

Andel, Tom (1997), "Information Supply Chain: Set and Get Your Goals," *Transportation and Distribution*, Vol. 38, No. 2, pp. 33.

Anderson, Erin and James A. Narus (1990), "A Model of Distributor Firm and Manufacturer Firm Working Relationships," *Journal of Marketing*, Vol. 54, January, pp. 42-58.

Bechtel, Christian and Jayanth Jayaram (1997), "Supply Chain Management: A Strategic Perspective," *International Journal of Logistics Management*, Vol. 8, No. 1 (1997), pp. 15-34.

Bowersox, Donald J. (1997), "Lessons Learned from the World Class Leaders," *Supply Chain Management Review*, Vol. 1, No. 1, pp. 61-67.

Bowersox, Donald J., Philip L. Carter, and Robert M. Monczka (1985), "Material Logistics Management," *Internal Journal of Physical Distribution and Logistical Management*, Vol. 15, No. 5, pp. 27-35.

Bowersox, Donald J. and David C. Closs (1996), *Logistical Management: The Integrated Supply Chain Process*, McGraw-Hill Series in Marketing, New York: The McGraw-Hill Companies.

Bucklin, Louis P. and Sanjit Sengupta (1993), "Organizing Successful Co-Marketing Alliances," *Journal of Marketing*, Vol. 57, April, pp. 32-46.

Cavinato, Joseph L. (1992), "A Total Cost/Value Model for Supply Chain Competitiveness," *Journal of Business Logistics*, Vol. 13, No. 2, pp. 285-301.

Christopher, Martin L. (1992), *Logistics and Supply Chain Management*, London: Pitman Publishing.

Cooper, Martha C. and Lisa M. Ellram (1993), "Characteristics of Supply Chain Management and the Implication for Purchasing and Logistics Strategy," *The International Journal of Logistics Management*, Vol. 4, No. 2, pp. 13-24.

Cooper, Martha, Lisa M. Ellram, John T. Gardner, and Albert M. Hanks (1997), "Meshing Multiple Alliances," *Journal of Business Logistics*, Vol. 18, No. 1, pp. 67-89.

Cooper, Martha C., Douglas M. Lambert, and Janus D. Pagh (1997), "Supply Chain Management: More Than a New Name for Logistics," *The International Journal of Logistics Management*, Vol. 8, No. 1, pp. 1-14.

Council of Logistics Management (1985), Oak Brook, IL: Council of Logistics Management.

Council of Logistics Management (1998), Oak Brook, IL: Council of Logistics Management.

Davenport, Thomas H. (1993), *Process Innovation, Reengineering Work through Information Technology*, Boston, MA: Harvard Business School Press.

Day, D. V. and R. G. Lord (1988), "Executive Leadership and Organizational Performance: Suggestions for a New Theory and Methodology," *Journal of Management*, Vol. 14, pp. 453-464.

Dowst, Somerby (1988), "Quality Suppliers: The Search Goes On," *Purchasing*, January 28, pp. 94A4-12.

Drozdowski, Ted E. (1986), "At BOC They Start With the Product," *Purchasing*, March 13, pp. 62B5-11.

Dwyer, F. Robert, Paul H. Schurr, and Sejo Oh (1987), "Developing Buyer-Seller Relationships," *Journal of Marketing*, Vol. 51, April, pp. 11-27.

Ellram, Lisa M. (1990), "The Supplier Selection Decision in Strategic Partnerships," *Journal of Purchasing and Materials Management*, Vol. 26, No. 4, pp. 8-14.

Ellram, Lisa M. and Martha C. Cooper (1990), "Supply Chain Management, Partnerships, and the Shipper-Third-Party Relationship," *The International Journal of Logistics Management*, Vol. 1, No. 2, pp. 1-10.

Felton, Arthur P. (1959), "Making the Marketing Concept Work," *Harvard Business Review*, Vol. 37, July-August, pp. 55-65.

Forrester, Jay W. (1958), "Industrial Dynamics: A Major Breakthrough for Decision Makers," *Harvard Business Review*, Vol. 38, July-August, pp. 37-66.

Frazier, Gary L. (1983), "On the Measurement of Interfirm Power in Channels of Distribution," *Journal of Marketing*, Vol. 53, January, pp. 50-69.

Ganesan, Shankar (1994), "Determinants of Long-Term Orientation in Buyer-Seller Relationships," *Journal of Marketing*, Vol. 58, April, pp. 1-19.

Gentry, Julie J. and David B. Vellenga (1996), "Using Logistics Alliances to Gain a Strategic Advantage in the Marketplace," *Journal of Marketing Theory and Practice*, Vol. 4, No. 2, pp. 37-43.

Giunipero, Lawrence C. and Richard R. Brand (1996), "Purchasing's Role in Supply Chain Management," *The International Journal of Logistics Management*, Vol. 7, No. 1, pp. 29-37.

Global Logistics Research Team at Michigan State University (1995), *World Class Logistics: The Challenge of Managing Continuous Change*, Oak Brook, IL: Council of Logistics Management.

Greene, Alice H. (1991), "Supply Chain of Customer Satisfaction," *Production and Inventory Management Review and APICS News*, Vol. 11, No. 4, pp. 24-25.

Gundlach, Gregory T., Ravi S. Achrol, and John T. Mentzer (1995), "The Structure of Commitment in Exchange," *Journal of Marketing*, Vol. 59, January, pp. 78-92.

Hambrick, Donald C. and Phyllis A. Mason (1984), "Upper Echelons: The Organization as a Reflection of its Top Managers," *Academy of Management Review*, Vol. 9, No. 2, pp. 193-206.

Heide, Jan B. and George John (1990), "Alliances in Industrial Purchasing: The Determinants of Joint Action in Buyer - Supplier Relationships," *Journal of Marketing Research*, Vol. 27, Winter, pp. 24-36.

Houlihan, John B. (1988), "International Supply Chains: A New Approach," *Management Decision,* Vol. 26, No. 3, pp. 13-19.

Jones, Thomas and Daniel W. Riley (1985), "Using Inventory for Competitive Advantage through Supply Chain Management," *International Journal of Physical Distribution and Materials Management,* Vol. 15, No. 5, pp. 16-26.

Kotter, J. P. (1990), *A Force for Change: How Leadership Differs from Management,* New York, NY: Free Press.

La Londe, Bernard J. (1997), "Supply Chain Management: Myth or Reality?" *Supply Chain Management Review,* Vol. 1, Spring, pp. 6-7.

La Londe, Bernard J. and James M. Masters (1994), "Emerging Logistics Strategies: Blueprints for the Next Century," *International Journal of Physical Distribution and Logistics Management,* Vol. 24, No. 7, pp. 35-47.

Lambert, Douglas M., James R. Stock, and Lisa M. Ellram (1998), *Fundamentals of Logistics Management,* Boston, MA: Irwin/McGraw-Hill, Chapter 14.

Langley, C. John, Jr. and Mary C. Holcomb (1992), "Creating Logistics Customer Value," *Journal of Business Logistics,* Vol. 13, No. 2, pp. 1-27.

Lassar, Walfried and Walter Zinn (1995), "Informal Channel Relationships in Logistics," *Journal of Business Logistics,* Vol. 16, No. 1, pp. 81-106.

Lee, Hau L. and Corey Billington (1992), "Managing Supply Chain Inventory: Pitfalls and Opportunities," *Sloan Management Review,* Spring, pp. 65-73.

Lee, Hau L., V. Padmanabhan, and Seungjin Whang (1997), "Information Distortion in a Supply Chain: The Bullwhip Effect," *Management Science,* Vol. 43, No. 4, pp. 546-558.

Lewis, I. and A. Talalayevsky (1997), "Logistics and Information Technology: A Coordination Perspective," *Journal of Business Logistics,* Vol. 18, No. 1, pp. 141-57.

Loforte, Anthony J. (1991), "The Implications of Multicultural Relationships in a Transnational Supply Chain," *National Association of Purchasing Management Annual Conference Proceedings,* pp. 69-77.

Lusch, Robert F. and James Brown (1996), "Interdependency, Contracting, and Relational Behavior in Marketing Channels," *Journal of Marketing,* Vol. 60, October, pp. 19-38.

Manrodt, Karl B., Mary C. Holcomb, and Richard H. Thompson (1997), "What's missing in Supply Chain Management?" *Supply Chain Management Review,* Vol. 1, No. 3, pp. 80-86.

Mentzer, John T. (1993), "Managing Channel Relations in the 21st Century," *Journal of Business Logistics,* Vol. 14, No. 1, pp. 27-42.

Monczka, Robert, Robert Trent, and Robert Handfield (1998), *Purchasing and Supply Chain Management,* Cincinnati, OH: South-Western College Publishing, Chapter 8.

Moorman, Christine, Rohit Deshpande, and Gerald Zaltman (1993), "Factors Affecting Trust in Market Research Relationships," *Journal of Marketing*, Vol. 57, January, pp. 81-101.

Morgan, Robert and Shelby Hunt (1994), "The Commitment—Trust Theory of Relationship Marketing," *Journal of Marketing*, Vol. 58, Summer, pp. 20-38.

Novack, Robert A., C. John Langley, Jr., and Lloyd M. Rinehart (1995), *Creating Logistics Value*, Oak Brook, IL: Council of Logistics Management.

Performance Management Group, LLC (2001) www.pmgbenchmarking.com.

Porter, Michael E. (1985), *Competitive Strategy: Techniques for Analyzing Industries and Competitors*, New York, NY: The Free Press.

Ross, David Frederick (1998), *Competing Through Supply Chain Management*, New York, NY: Chapman & Hall.

Salcedo, Simon and Ann Grackin (2000), "The e-Value Chain," *Supply Chain Management Review*, Vol. 3, No. 4, pp. 63-70.

Schmitz, Judith M., Robb Frankel, and David J. Frayer (1994), "Vertical Integration without Ownership: the Alliance Alternative," *Association of Marketing Theory and Practice Annual Conference Proceedings*, Spring, pp. 391-396.

Spekman, Robert E. (1988), "Strategic Supplier Selection: Understanding Long-Term Buyer Relationships," *Business Horizons*, Vol. 31, July-August, pp. 75-81.

Stern, Louis W. and Adel I. El-Ansary (1988), *Marketing Channels*, 3rd Ed. Englewood Cliffs, NJ: Prentice Hall.

Stevens, Graham C. (1989), "Integrating the Supply Chains," *International Journal of Physical Distribution and Materials Management*, Vol. 8, No. 8, pp. 3-8.

Tosti, D. and S. Jackson (1990), "Alignment: How It Works and Why It Matters," *Training*, Vol. 31, April, pp. 58-64.

Treleven, Mark (1987), "Single Sourcing: A Management Tool for the Quality Supplier," *Journal of Purchasing and Materials Management*, Vol. 23, Spring, pp. 19-24.

Tyndall, Gene, Christopher Gopal, Wolfgang Partsch, and John Kamauff (1998), *Supercharging Supply Chains: New Ways to Increase Value Through Global Operational Excellence*, New York, NY: John Wiley & Sons.

Webster, Frederick E., Jr. (1988), "Rediscovering the Marketing Concept," *Business Horizons*, Vol. 31, May-June, pp. 29-39.

Webster, Frederick E., Jr. (1992), "The Changing Role of Marketing in the Corporation," *Journal of Marketing*, Vol. 56, October, pp. 1-17.

ABOUT THE AUTHORS

John T. (Tom) Mentzer is the Harry J. and Vivienne R. Bruce Excellence Chair of Business in the Department of Marketing, Logistics and Transportation at the University of Tennessee. He has published five books, and more than 140 articles and papers in the *Journal of Business Logistics, Journal of Marketing, Journal of Business Research, International Journal of Physical Distribution and Logistics Management, Transportation and Logistics Review, Transportation Journal, Journal of the Academy of Marketing Science, Industrial Marketing Management, Research in Marketing, Business Horizons,* and other journals.

William J. DeWitt, Ph.D., is a Teaching Professor in logistics, transportation, and supply chain management at the R.H. Smith School, University of Maryland, College Park. He serves on intermodal and education committees of TRB, and has published in *Transportation in the New Millennium, Transportation Journal, Logistics Technology International, Defense Transportation Journal,* and *Business Geographics,* in addition to working for more than twenty years at Burlington Northern Railroad, and also serving as vice president marketing and sales.

James S. Keebler is an Assistant Professor of Marketing at the G.R. Herberger College of Business at St. Cloud State University. Dr. Keebler has over 25 years of practitioner experience in manufacturing, marketing, and logistics management across several industries. He is a co-author of the books, *Keeping Score: Measuring the Business Value of Logistics in the Supply Chain* and *Supply Chain Management.*

Soonhong (Hong) Min is an Assistant Professor of Logistics and Marketing at Georgia Southern University. He has published in the *Journal of Retailing, International Journal of Physical Distribution and Logistics Management, International Marketing Review,* and is a co-author of the book, *Supply Chain Management.*

Nancy W. Nix is the Director of the Center for Value Chain Management at Texas Christian University. Her primary interests are global supply chain management, creating customer value through logistics service quality, and management of the sales forecasting and operational planning process. She has extensive industry experience and has worked with multiple companies to improve the management of supply chain activities and processes. She is a co-author of the book, *Supply Chain Management.*

Carlo D. Smith is an Associate Professor of Marketing at the University of San Diego. His articles have appeared in the *Journal of Business Logistics, Journal of Business Forecasting, Business Horizons,* and the *Journal of Consumer Satisfaction, Dissatisfaction and Complaining Behavior.*

Zach G. Zacharia is an Assistant Professor in the Department of Marketing at Texas Christian University. He has published in the *Journal of Retailing, Journal of Vehicle Design, Transportation Research Record, Materials Performance,* and is a co-author of the book, *Supply Chain Management.*

Copyright of Journal of Business Logistics is the property of Council of Logistics Management. The copyright in an individual article may be maintained by the author in certain cases. Content may not be copied or emailed to multiple sites or posted to a listserv without the copyright holder's express written permission. However, users may print, download, or email articles for individual use.