

Journal of

INDUSTRIAL TECHNOLOGY

Volume 20, Number 2 - February 2004 to April 2004

Supply Chain Management: Strategic Factors From The Buyers' Perspective

By Dr. Ronald L. Meier, Dr. Michael R. Williams, and Mr. Rodger B. Singley

Peer-Refereed Article

KEYWORD SEARCH

*Industrial Distribution
Management
Quality
Research
Supply Chain Management*

The Official Electronic Publication of the National Association of Industrial Technology • www.nait.org

© 2004



Dr. Ronald L. Meier has been in the Technology Department at Illinois State University since 1994. His scholarly work focuses on organizational competitiveness issues, primarily oriented toward enterprise risk and project management. His teaching responsibilities include graduate level project management courses and the oversight and delivery of a six-course series of project management courses designed for business and industry professionals. Dr. Meier has published or co-published over 50 papers in various technical and management journals.



Dr. Mike Williams is a professor in the Department of Marketing at Illinois State University and Director of the Professional Sales Institute. He received his Ph.D. in marketing from Oklahoma State University. In addition to authoring numerous books, his work has also been published in *Quality Management Journal*, *International Journal of Purchasing and Materials Management*, *Journal of Personal Selling and Sales Management*, *Journal of Business and Industrial Marketing*, *Journal of Industrial Technology*, *Competitiveness Review*, *Journal of Engineering Education*, and the *Journal of Marketing Theory and Practice*.



Rodger B. Singley is an associate professor of Marketing at Illinois State University since 1989. His teaching areas include International Marketing, Sales Management, and Retail Management with students at both the undergraduate and graduate levels. His scholarly interests include international business issues, insurance fraud, supply chain management, and project management.

Supply Chain Management: Strategic Factors From The Buyers' Perspective

By Dr. Ronald L. Meier, Dr. Michael R. Williams, and Mr. Rodger B. Singley

Introduction And Overview

Business is characterized as evolving away from its traditional focus on single exchange transactions and toward an emphasis on creating and maintaining longer-term buyer-seller relationships. These strategic relationships generate managed supply chains. For the purpose of this article a managed supply chains encompasses all the activities associated with the flow and transformation of goods from raw materials to the end user, as well as the associated information flows. Materials and information must simultaneously flow both up and down the supply chain to leverage strategic positioning and to improve operating efficiency.

However, to date, our knowledge and understanding regarding effective supply chain management practice is limited to case studies and anecdotal documentation, which provides little in the way of reliable, theory-based tools and guidance for managers. Indeed, the importance of the study reported herein was emphasized at the CAPS 2001 North American Executive Roundtable where Chief Purchasing Officers from Fortune 500 companies voted the development of supply chain measures and models to be the most important topic for future research (Hendrick & Ogden 2001). The development and subsequent application of valid, theory-based measures and models are critical if companies are to establish and effectively manage supply chains.

Supply Chain Management (SCM) is a priority topic for contemporary social, economic, and industrial technology researchers at the global level (Dodgson 2001). As stated by a Vice- President of the Boston Consulting Group, "As the

economy changes, as competition becomes more global, it is no longer company vs. company but supply chain vs. supply chain" (Henkoff 1994). Properly implemented, SCM can positively impact many functions and outcomes of the organization including product quality, customer responsiveness and resultant satisfaction, manufacturing cost control, product and market flexibility, and macro performance outcomes including market share and profitability.

Purpose of This Study

The purpose of this study was to expand the knowledge base regarding planning, implementation, and ongoing operation of Supply Chain Management (SCM) initiatives. Other purposes of this study included development of information and recommendations to aid organizations in improving their existing SCM practices. More specifically, this study addressed the following four objectives.

1. An in-depth examination of the role of partnerships in SCM
2. An understanding of the process and environment of partnership formation
3. An identification of organizational characteristics influencing partnership formation and operation
4. The identification of potential conflict areas in partnership formation and operation

Overview of This Study

Due to page and publication limitations the remainder of this paper examines only the first phase of a two-phase multi-year study. This first phase investigated the evolving concept of supply chain management (SCM) and

its current practice in contemporary business strategy. Exploratory in nature, this phase worked with supporting industry partners and their supplier and purchasing managers and university academicians to identify and study the key factors in strategically managed supplier-buyer relationships. The results from this first phase were twofold. First, the results were used to develop a comprehensive set of descriptive item statements for each of the constructs coming out of the Q-sort analysis. Second, the results yielded information about perceived relationships between the constructs and variables for the purpose of generating hypotheses describing the posited relationships among the variables comprising the conceptualized model of supply chain management: the antecedents, moderators, and outcomes. Phase two began in August 2003. During phase two the perceived relationships between the constructs and variables are being tested to validate the researcher's perceptions of the hierarchical relationships that constrain the choice of supply chain partners. These results will be reported in a future manuscript.

Review of Related Research

As both research and practice in SCM have increased, the knowledge base has also grown. A historical perspective illustrates one significant and necessary stream of literature is concerned with establishing the nature and scope of SCM practice. There exists diversity in the realm of supply chain management research as some researchers have focused mainly upon the definition of the supply chain (i.e. Christopher 1992) while others concentrate upon both the definition of the supply chain along with the strategic management thereof (Mentzer 2001; Dodgson 2001; Crowley & Domb 1997). Closely related is research into the overall makeup and environment of SCM including the structure, processes, and components (Dyer 2000; Mariotti 1999; Lambert et al 1998; Cooper, Lambert and Pagh 1997).

Another frequently researched component of SCM is the exploration and understanding of the motivations for/benefits of engaging in SCM. The literature was developed from the areas of quality control and expedient delivery (Rich and Hines 1997; Davis 1993); lean/agile manufacturing (Womack and Jones 1996); shortened product life cycles (Fine 1999); and increased domestic and global competition (Blackwell 1999; Tyndall 2000). Reported benefits of research in SCM included decreased order cycle time (Sheridan 1999); reduced costs/increased efficiency (Christopher and Ryals 1999; Quinn 2000); improved product delivery and responsiveness (LaLonde and Masters 1994); and revenue and profitability growth (Timme & Timme 2000; Quinn 2000). Finally, both bridges and barriers to implementing supply chains have received a great deal of research attention (i.e., Monczka and Morgan 1997; Blackwell 1999; Stank, Daugherty & Ellinger 1999).

Existing research begins to provide a description of the nature and environment of SCM along with the motivations for and benefits of engaging in SCM. What is lacking is a holistic and systematic investigation of supply chain practice. Both manufacturing firms and their consultants recognize the need for additional knowledge in this area. For example, a focus group participant (April 24, 2003) from Caterpillar Logistics, Decatur, IL stated that in the view of his logistics teams, the development of assessment tools for determining the effectiveness of strategic partnerships was a critical issue.

Methodology

In line with the multiple objectives of this study, three focus groups were utilized to identify and validate the criteria for successful SCM relationships as perceived by suppliers and buyers. Each focus group was comprised of supply chain practitioners from business/industry and academia. Business and industry participants included representatives from Archer Daniels Midland, Caterpillar, Com-

puter Discount Warehouse, Delco Remy, Delphi Automotive, Detroit Diesel, Detroit Edison, Electromotive Division – General Motors, Ford Motor Company, Growmark, Mitsubishi Motors of North America, Northern Automotive Systems, Rhon, Sherwin-Williams, State Farm Insurance, and Verizon. Academic institution participants included representatives from Appalachian State University, Arizona State University, Ball State University, Bradley University, Illinois State University, Northern Kentucky University, University of Southern Mississippi, and East Texas State University. These participants were selected based upon their expertise and interest in developing better evaluative and predictive tools for monitoring and controlling efficient and effective business partner relationships.

As illustrated in Figure 1 on page 4 and discussed in detail below, this study began with a qualitative investigation to explore and delineate actual supply chain practices. The first phase of research, consistent with the tenets of exploratory research and scale development (Churchill 1979; Nunnally 1978), utilized qualitative investigation techniques including literature review, observation of existing practices, focus groups, and in-depth interviews. This qualitative investigation was designed to identify potential variables functioning as antecedents, moderators, and outcomes of successful supply chain management.

Literature Review, Observation, and Interviews

Phase one of this study was exploratory in nature and consisted of three primary components: (1) study of published research findings and literature on inter- and intra-organizational relationships and supply chain management practices, (2) observation of actual supply chain management practices in business and industry, and (3) interviews with supplier and purchasing managers. The archive of materials assembled for the initial qualitative investigation included relevant items from principal publications and sources such as:

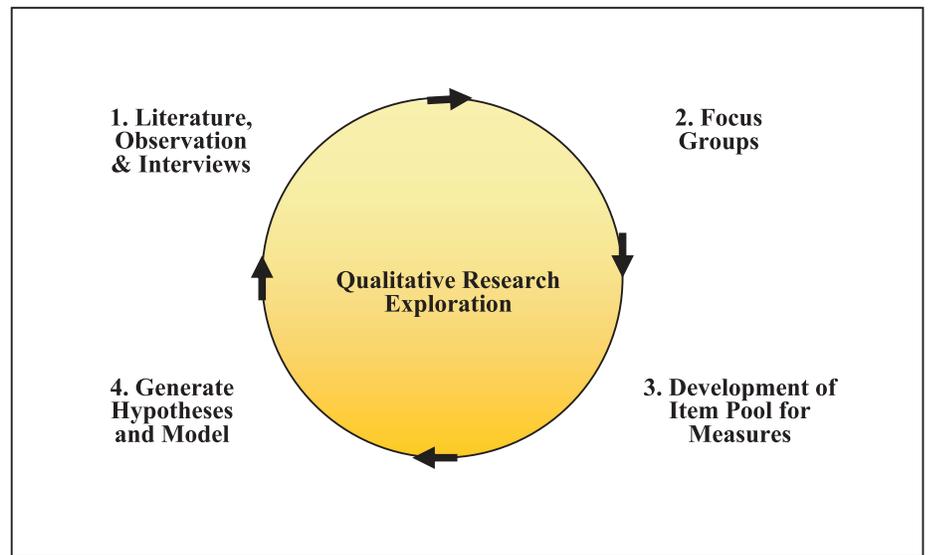
- International Journal of Physical Distribution and Logistics
- Journal of Business Logistics
- Supply Chain Management: an International Journal
- Industrial Marketing Management
- Supply Chain Management Review
- Institute for Supply Management (ISM) [formerly the National Association of Purchasing Management]
- Center for Advanced Purchasing Studies (CAPS)

Initial analysis of the data collected in this formative phase was subjected to a series of commonly accepted and recommended qualitative analysis techniques. First, the various comments and observations were content analyzed by the principle investigators to establish common items (Kerlinger 1986). Common items were then subjected to a series of Q-Sort analyses. Q-sort is a form of qualitative factor analysis for the purpose of sorting the various observed items into common categories that will translate into the constructs and variables relevant to subsequent stages of this research (Kerlinger 1986). For the purpose of maximizing external validity of the results, Q-sort analyses was conducted by knowledgeable research scholars and managers from both purchasing as well as supplying firms.

Item Statements and Conceptual Model

Using the variables and constructs derived from the Q-sort analyses as their subject targets, focus group respondents completed a series of Hoshin Analyses (Cowley and Domb 1997). Hoshin analysis is an accepted qualitative analysis technique for organizing and ordering large amounts of qualitative data (Bergman and Klefsjo 1994). First, multiple rounds of Hoshin affinity analyses were conducted in order to generate a comprehensive set of descriptive items for each of the targeted variables and constructs items. These descriptive items became the initial item pool for use in developing valid measures of each variable (Churchill 1979). Valid

Figure 1. Qualitative Research Methodology



measures are central to the latter phases of this research designed to explicate the nature and magnitude of association and influence among the subject variables.

A supply chain model describing posited relationships between the variables was derived through the use of Hoshin relation analyses and interrelationship digraphs to parse out the conceptualized nature and order of relationships between the variables and constructs (Bergman and Klefsjo 1994). With the Hoshin model as a framework, secondary research was conducted to establish sound and theoretically justified explanations of the conceptual model.

Analysis Techniques

Hoshin Analysis: The Process

The tools utilized in the Hoshin process have been adopted from behavioral science, operational analysis, optimization theory, and statistics and include (1) affinity analysis, (2) relationship diagrams, and (3) tree diagrams (Bergman & Klefsjo 1994). Affinity analysis is also known as the K-J Method after its Japanese originator Jiro Kawakita.

An affinity analysis was done with each of the three small focus groups in

which a large number of ideas were first generated and then sorted by group members into categories to form topical content groupings. Subsequent iterations of affinity analysis were used to further flesh-out each of the previously established groups to form a tree diagram depicting the hierarchical relationship of each category and the content comprising each of the more macro categories.

Relational Analysis and Diagrams (See Figure 2) were then used to explicate and illustrate the dependency relationships between the primary categories established in affinity analysis. Relational analysis calls for the broader, topical content groupings to be sorted by order of interdependence with each of the other topical content groupings to create a suggested ordering for presentation. That is, topical content groups having the most causal relationships would logically be presented before groups having fewer causal inter-dependencies.

Outcomes of the Hoshin Analysis Process

Due to space limitations, the remainder of this manuscript will focus on SCM success criteria from the perspective of a buyer evaluating a potential supplier. A similar set of criteria was identified

from the perspective of a supplier evaluating a potential buyer. This later set of criteria will be examined in a subsequent manuscript.

For this segment of the study a Hoshin analysis was conducted with one of the practitioner/academician focus groups (N = 9). This group was asked the following question to help set the stage for generating items.

[As a Buyer – What would be the list of (factors, items, attributes) of a potential channel partner “Sup-

plier” that would predict an effective business relationship?]

Each member of the group then proceeded to generate as many items as possible in 15 minutes. Eighty-five unique item statements were generated. At this point, the focus group members were asked to group the items by common theme. Then each grouping of items was given a name to establish a broader-based theme. As shown in Tables 1 - 11 the sorting and grouping process yielded eleven fundamental thematic areas that the group believed

were inherent to being able to predict an effective business relationship.

This step provided a foundation for the main topical areas to be targeted for future survey item pool development. Further analysis delineated the content of each thematic area, developed a corresponding tree diagram, and established the order of dependency among the thematic areas. The Hoshin process further refined the insight into what specifically should be included in the survey item pool and established the most critical thematic areas to

Items
Has Relevant Technical Capabilities
Uses Compatible Information Technology
Invests in Research & Development
Has Relevant Technical Knowledge
Maintains a High Level of Technology
Streamlines Business Transactions
Constantly Analyzes Performance Data & Information
Provides Effective Cross-Company Measurement System

Table 1. Product and Information Technology

Items
Reacts to Changes in My Business
Facilitates Networking w/other Customers & Partners
Assists Us to Expand Our Sales
Has Desire to Partner Rather than Just Provide
Demonstrates Commitment to Customer
Is Accessible
Thinks Creatively
Has a Long-term Perspective

Table 2. Partnering Capability

Items
Maintain A Good Credit Rating
Establishes A Reliable Record Of Business Performance
Keep The Buying Firm In A Strong Competitive Position Within Its Industry
Supply Chain Partners Use Similar Financial Measures
Pay Suppliers Promptly
Is Financially Stable
Pays On Time
Has Financial Strength

Table 3. Financial Strength

Items
Practices Fair Pricing
Practices Lean Management
Engages in Continuous Cost Improvement
Understands Total Costs
Provides Economic Advantage to Partnering
Manages-in Cost Reductions

Table 4. Value-Based Pricing

Items
Has Compatible Culture/Values
Respects Confidentiality
Accepts Responsibility
Demonstrates Positive Management Skills
Has a Positive Attitude
Makes Decisions Quickly
Demonstrates Ability to Evolve
Behaves Professionally
Engages in Ethical Practices
Provides an Atmosphere of Continuous Improvement
Regularly Reviews Performance & Capabilities

Table 5. Leadership Management

Items
Provides Sales Growth Potential
Posses Good Production Facilities
Manages Change As A Critical Success Factor For The Entire Supply Chain
Manages Key Product and Service Delivery Processes
Helps Manage Partnering Interactions and Processes
Provides Flexibility
Employs a Skilled Workforce
Possess Volume Flexibility
Provides Multiple Items I Need
Is Scalable

Table 6. Production Capabilities

Items
Ships Materials With My Target Date in Mind
Provides Reliable Delivery
Possess Broad Geographic Delivery Capabilities
Achieves Accuracy in Shipments
Is Knowledgeable in Logistics
Is Effective in Supply Chain Management

Table 7. Logistics Capabilities

Items
Representatives Have A Good Knowledge Of My Business
Has Competent Sales Representatives
Sales Force Is Honest
Sales Force Is Reliable
Is Willing To Do Things Differently
Is Easy To Work With
Willing To Change
Is Effective In Problem Resolution

Table 8. Sales Representation

Items
Communicates Status Of Order Information
Communicates Well With Plant & Corporate Staff
Provides Accurate Information
Demonstrates Responsiveness

Table 9. Effective Communications

Items
Provides Quality Products and Services
Strives For Zero Defects
Seeks Overall Productivity Improvement
Provides Easy Return Policy
Utilizes Protective Packaging
Supply Chain Partners Jointly Set Strategic Directions
Performance Measures Projected Into The Future

Table 10. Quality

Items
Has Clear and Understandable Pricing & Product Information
Responds Quickly To Requests For Information
Provides Helpful Engineering Support
Recognizes Their Strengths
Understands Their Limits
Provides Key Market/Industry Information
Understands The Market
Cooperatively Determines Short- and Long-Term Business Requirements
Builds Relationships With Customers

Table 11. Customer Service

target initially. Figure 2 illustrates the results of the relationship or dependency sequencing activity.

In a step-wise fashion, the focus group participants were asked to consider the relationships among all thematic areas. Is there a relationship? And if so, is one thematic area more dependent on the other? Arrows were drawn between thematic areas that were related, with the arrow indicating the direction of influence. For example, if an arrow pointed from “leadership management” to “effective communication” it was an indication that the focus group believed the thematic area “effective communication” was related to and dependent upon topics or items in “leadership management.” Overall, the more arrows leading from a thematic area, the more it was considered fundamental and influential to the other thematic areas. Figure 2 suggests that the topics of “leadership management,” “product information technology,” and “partnering capability” were the most highly related and influential topics as they had the highest number of arrows leading from them. These areas became the primary targets for initial investigation and analysis. The results of the Interrelationship Diagram are shown in Table 12. This table lists the items in their prioritized order of dependency.

Outcomes

Three major outcomes of this study are identified below. Each of these outcomes delivers a critical element or piece of the puzzle to aide future studies with the development of supply chain measurement and benchmark tools. This study also furnished supporting documentation to explain the hierarchical relationships among the various thematic content areas.

- Identification of the thematic content areas that will enable the future development of benchmarking tools and allow organizations to determine suitable supply chain partners
- Identification of intra-organizational characteristics that enable and/or impede the formation and operation of supply chain

- partnerships
- Identification of organizational characteristics that constrain the choice of supply chain partners

Discussion And Implications

In the late 1980’s and early 1990’s, suppliers sought to develop partnerships with customer firms. Marketing and sales managers asked their workforces to become “partners” with their key suppliers. Nonetheless, many

of the people comprising this buyer-seller relationship did not understand the implications of exactly what was meant by becoming a “partner.” Many organizations were concerned with the legal ramifications of the term “partner.” Therefore, the term partnership has taken a backseat to the three types of buyer-supplier relationships that have evolved since the late 1980’s. At first, transactional relationships appeared, then collaborative and

Figure 2. Interrelationship Diagram of Grouped Items

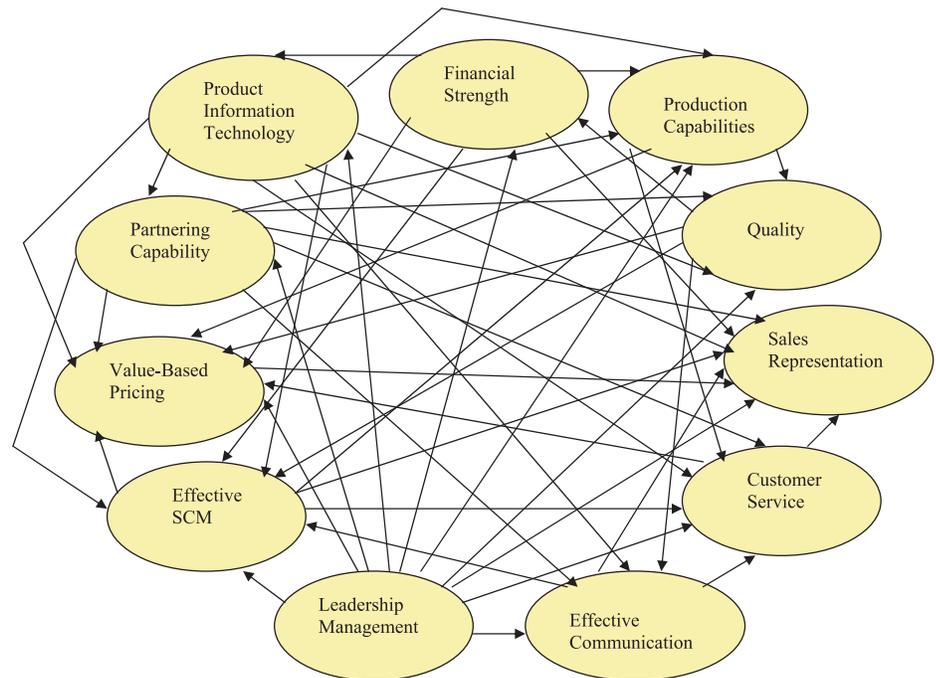


Table 12. Dependency Rankings of Partnering Items Used to Predict Effective Business Relationships

ITEM	OUT ARROWS	IN ARROWS
Leadership Management	10	0
Product Information Technology	8	2
Partnering Capability	7	2
Financial Strength	5	2
Effective Supply Chain Management	4	6
Quality	4	4
Production Capabilities	3	5
Effective Communications	3	3
Customer Service	2	7
Value-Based Pricing	1	8
Sales Representation	0	8

alliance relationships, and finally supply alliances (Mariotti 1999, Dyer 2000).

The findings from the Hoshin analysis discussed earlier support both Mariotti's and Dyer's work. The item groupings of "product and information technology," "financial strength," and "value-based pricing" support the transactional perspective. The item groupings of "partnering capability," "effective communications," "sales representation," and "customer service" relate directly to Dyer's description of collaborative and alliance relationships. Additionally, these four groupings support the findings of a May, 2000 conference presentation by Stanley and Pearson where they examined buyer-supplier purchasing strategies in the electronic industry. Lastly, Mariotti's description of the supplier alliance relationship encompassed the Hoshin item groupings of "leadership management," "production capabilities," "logistic capabilities," and "quality."

Results from this study suggest there are a large number of factors important in the practice of efficient and effective supply chain management. Characteristics within organizations and the interaction of these characteristics in inter-organizational relationships further complicate the understanding and modeling of supply chain practice. However, clearly delineating the critical thematic content areas and organizational characteristics is a necessary step in the improvement of supply chain practice. Outcomes of this study are useful not only in the development of future models and benchmarking tools, but can also be used to improve existing supply chain management tools.

Additionally, the findings from this study provide useful information for the improvement of curriculum concerned with supply chain management. Understanding the criteria leading to supply chain success provides the foundation for courses that examine: leadership management, product information

technology, partnering capabilities, companies' financial strength, and organizational quality. Teaching faculty at both community colleges and universities must actively engage students in individual and collaborative problem solving, analysis, synthesis, critical thinking and reflections to real world situations. As a result new curriculum materials must be proposed, developed, and implemented to expand these management aspects related to supply chain development.

References

- Bergman, B. and B. Klefsjo (1994). Quality: From Customer Needs to Customer Satisfaction. London: McGraw Hill Book Company Europe.
- Blackwell, R. D. (1999). The Century of the Consumer: Converting Supply Chains into Demand Chains. Supply Chain Management Review. Fall, pp. 34-49.
- Christopher, M. (1992). Logistics and Supply Chain Management: Strategies for Reducing Costs and Improving Service. London: Pitman.
- Christopher, M. & Ryals, L. (1999). Supply Chain Strategy: Its Impact on Shareholder Value. International Journal of Logistics Management. Vol. 10, No. 1, pp. 1-10.
- Churchill, G. A. (1979). "A Paradigm for Developing Better Measures of Marketing Constructs," Journal of Marketing Research, Vol. 16 (February), pp. 64-73.
- Cooper, M. C.; Lambert, D. M. & Pagh, J. D. (1997). Supply Chain Management: A New Name for Logistics. International Journal of Logistics Management. Vol. 8, No. 1, pp.1-13.
- Cowley M. and E. Domb (1997) Beyond Strategic Vision: Effective Corporate Action with Hoshin Planning. Boston: Butterworth-Heinemann.
- Davis, T. (1993). Effective Supply Chain Management. Sloan Management Review. Summer, pp. 35-46.
- Dodgson, M. (2001). Strategic Research Partnerships: Their Role, and

Some Issues of Measuring Their Extent and Outcomes Experiences from Europe and Asia. Retrieved March 15, 2002, >From <http://www.nsf.gov/sbe/srs/nsf01336/p1s8.htm>

- Dyer, J. H. (2000). Collaborative Advantage. N.Y., N.Y. Oxford University Press, 2000, pp.42-3.
- Fine, C. H. (1999). Clockspeed: Winning Industry Control in the Age of Temporary Advantage. Reading, MA: Perseus Books.
- Hendrick, T. E. & Ogden, J.(2001). Chief Purchasing Officers Compensation Benchmarks and Demographics: A 2001 Study of Fortune 500 Firms. Center for Advanced Purchasing Studies. Arizona State University. Tempe, AZ
- Henkoff, R. (1994). Delivering the Goods. Fortune, 130 pp. 64-78.
- Joreskog, K. and D. Sorbom (1998). LISREL 8. Hillsdale, NJ: Lawrence Erlbaum Associates Publishers.
- Kerlinger, F. N. (1986). Foundations of Behavioral Research. Holt Rinehart and Winston, Inc. Orlando, FL
- Lalonde, B. J. & Masters, J. M. (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 et al (1998). Supply Chain Management: Implementation Issues and Research Opportunities. International Journal of Logistics Management. Vol. 9, No. 2, pp. 1-19.
- Mariotti, J. L. (1999). Collaboration Is The Way To Go. Supply Chain Management Review. Spring 1999.
- Mentzer, T. (2001). Supply Chain Management. California: Sage.
- Monczka, R. M. & Morgan, J. P. (1997). What's Wrong with Supply Chain Management? Purchasing. January 16.
- Nunnally, J. C. (1978). Psychotremetric Theory. New York: McGraw Hill Book Company
- Quinn, F. J. (2000). The Clockspeed Chronicles. Supply Chain Management Review. Vol. 3, No. 4, pp. 60-64.
- Rich, N. & Hines, P. (1997). Supply-Chain Management and Time-based

- Competition: The Role of the Supplier Association. International Journal of Physical Distribution and Logistics Management. Vol. 27, No. 3 & 4, pp. 210-225.
- Sheridan, J. H. (1999). Managing the Chain. Industry Week. September, 6. pp. 50-66.
- Stank, T.; Daugherty, P. & Ellinger, A. E. (1999). Marketing/Logistics Integration and Firm Performance. International Journal of Logistics Management. Vol. 10, No. 1, pp.11-24.
- Stanley, L. L. & Pearson, J. N. (2000). Buyer-Supplier Strategies and Their Impact on Purchasing Performance: A Study of the Electronics Industry. Conference 2000, Richard Ivey School of Business, University of Western Ontario. London, May 24-27, 2000.
- Timme, S. G. & Williams-Timme, C. (2000). The Financial SCM Connection. Supply Chain Management Review. Vol. 4, No. 4, pp.32-40.
- Tyndall, G. R. (2000). The Global Supply Chain Challenge. Supply Chain Management Review. Vol. 3, No. 4, pp.13-15.
- Womack, J. & Jones, D. (1996). Lean Thinking. New York, NY: Simon & Schuster
-