

A Framework for Teaching Supply Chain Management

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Abstract

The rise of global markets and increasingly virtual companies has focused management attention on competition between supply chains. Many schools of management and engineering are adopting integrated curricula that prepare students to design and manage the resulting complex global web of material and information flows. In this paper, we examine the curriculum used by many top engineering and graduate business schools for courses in supply chain management. We present a framework for supply chain management and highlight supporting material and pedagogy. We also classify popular supply chain case studies within our framework and provide useful references to recent business press treatment of these issues.

Keywords: Supply chain management, Education

Introduction

In April, 1995 a panel of academics gathered at the Spring INFORMS meeting to discuss the emerging interest in supply chain management. At that time, only a handful of universities taught a course with the title “supply chain management,” although some were teaching supply chain concepts in courses under the label “logistics” or “operations management.” Today, many top business schools along with some engineering programs have courses titled “supply chain management” and more are added each year. In nearly all of the top MBA programs, core operations management courses have been augmented with significant content on supply chains (van Wassenhove and Corbeyz, (1998)).

Skeptics would argue that this rush to change curriculum was little more than a repackaging of topics long covered in operations management such as logistics, inventory control, and facility location. Or that, as with quality control in the 1970s and lean manufacturing in the 1980s, supply chain was the popular management fad of the late 1990s. But a closer look at both business practice and MBA programs reveals stronger forces at work, creating an environment ripe for supply chain concepts. Integration, long the dream of management gurus, was slowly sinking into the minds of western managers and business school deans. As we shall see, integration may be the key unifying theme behind supply chain curriculum and practice. For example, product design, manufacturing, and logistics are coming head-to-head with channel design and category management; and traditional functional silos of marketing, R&D, manufacturing, and logistics are consolidating into the integrated supply chain.

Others would contend that managers have long been interested in integration, but the lack of information technology made it impossible to implement a more “systems-

oriented” approach. Clearly industrial dynamics researchers dating back to the 1950’s (Forester 1958, 1961) have maintained that supply chains should be viewed as an integrated system. With the recent explosion of inexpensive information technology, it seems only natural that business would become more supply chain focused. However, while technology is clearly an enabler of integration, it alone can not explain the radical organizational changes in both individual firms and whole industries. Changes both in technology and in management theory set the stage for integrated supply chain management.

While integration and information technology may have been key catalysts in the surge of interest surrounding supply chains, eBusiness is fueling even stronger excitement. eBusiness facilitates the virtual supply chain, and as companies manage these virtual networks, competition is increasingly no longer business-to-business but rather supply-chain-to-supply-chain. In other words, the importance of integration is magnified.

Still many would argue that the language and metaphors are wrong. “Chains” evoke images of linear, unchanging, and powerless. “Supply” feels pushy and reeks of mass production rather than mass customization. Better names, like “demand networks” or “customer driven webs” have been proposed by many a potential book author hoping to invent a new trend. Yet, for now, the name “supply chain” seems to have stuck. And under any name, the future of supply chain management appears bright.

In this paper, we examine the curricula used by many top engineering and graduate business schools for courses in supply chain management. We first present a framework comprising twelve key components of a “typical” supply chain management

course. Next we discuss how each of the components is taught and present references that are useful as student reading assignments. Using our framework, we categorize popular teaching cases and recent business news stories related to supply chain management. We also briefly discuss pedagogy and the use of games, projects, and simulations. Finally, we examine the structure of several courses at U.S. institutions.

Key Components of Supply Chain Management

Supply chain management is an enormous topic covering multiple disciplines and employing many quantitative and qualitative tools. In our survey of class syllabi we observed a wide range of topics and a great diversity in the detail with which those topics were examined. Most of the graduate level classes did not use a textbook but rather relied on case studies and on articles from managerial journals. Within the last three years, several textbooks for supply chain have arrived on the market providing both managerial overviews and detailed technical treatments. For examples of managerial introductions to supply chain management see Copacino (1997), and Handfield and Nichols (1998), and for logistics texts see Lambert, et al. (1997) and Ballou, R.H. (1998). For more technical, model-based treatments see Silver, Pyke, and Peterson (1998) and Simchi-Levi, Kaminsky, and Simchi-Levi (1998). Also, there are several casebooks that give emphasis to global management issues including Taylor (1997), Flaherty (1996), and Dornier et al. (1998). In this paper, we will concentrate on courses that are primarily supported by recent articles and cases.

Since integration is an overriding theme in supply chain, many different functional areas are addressed within a single course. At most U.S. business schools,

supply chain management is taught from an operations or logistics perspective. This paper is most closely tied to such a perspective. To enhance the theme of integration, some schools employ the participation of several instructors from different functional perspectives – most frequently from operations, logistics, marketing, and organizations. In courses taught by a single faculty member, this same idea may be accomplished by guest lectures or by the instructor actively presenting different perspectives. By its very nature supply chain is integrative, so it might seem inappropriate to “dis-integrate” it when presenting it to students. However, it is impossible to address all the dimensions of supply chain management at one time. Therefore, most instructors discuss certain dimensions in depth before moving on to others. Integration, of course, can be addressed in each category.

To help order our discussion, we have divided supply chain management into twelve areas. We identified these twelve areas from our own experience teaching supply chain management, from analysis of syllabi of many supply chain courses, and from our discussions with other instructors. Each area represents a supply chain issue facing the firm. For any particular problem or issue, managers may apply analysis or decision support tools. For each of the twelve areas, we provide a brief description of the basic content and refer the reader to recent articles that make suitable class reading assignments. We also mention likely operations research based tools to aid in analysis and decision support. In the subsequent section, we present an extensive list of recent (since 1990) teaching cases, each categorized within our framework (Table 1). We will also present a list of recent news articles classified into the twelve areas.

The twelve categories we define are

- location
- transportation and logistics
- inventory and forecasting
- marketing and channel restructuring
- sourcing and supplier management
- information and electronic mediated environments
- product design and new product introduction
- service and after sales support
- reverse logistics and green issues
- outsourcing and strategic alliances
- metrics and incentives
- global issues.

Before launching into a particular selection of topics, most courses begin with an introduction to supply chain, often emphasizing the importance of integration. There are numerous suitable first day readings including Cooper, Lambert, and Pagh (1997a), Davis (1993), Johnson (1998a), and Lee and Billington (1992).

Location pertains to both qualitative and quantitative aspects of facility location decisions. This includes models of facility location, geographic information systems (GIS), country differences, taxes and duties, transportation costs associated with certain locations, and government incentives (Hammond and Kelly (1990)). Exchange rate issues fall in this category as well, as do economies and diseconomies of scale and scope.

Decisions at this level set the physical structure of the supply chain and therefore establish constraints for more tactical decisions. Optimization models play a role here, as do simple spreadsheet models and qualitative analyses. There are many advanced texts specially dedicated to the modeling aspects of location (Drezner (1996)) and most books on logistics also cover the subject. Simchi-Levi et al. (1998) present a substantial treatment of GIS while Dornier et al. (1998) dedicate a chapter to issues of taxes, duties, exchange rates, and other global location issues.

The *transportation and logistics* category encompasses all issues related to the flow of goods through the supply chain, including transportation, warehousing, and material handling. Depending on the intent of the instructor, this may include many of the current trends in transportation management including vehicle routing, dynamic fleet management with global positioning systems, and merge-in-transit. Also included are topics in warehousing and distribution such as cross docking and materials handling technologies for sorting, storing, and retrieving products. This category contains much of what was traditionally taught in logistics courses and there are many excellent texts on the subject. Useful short articles include Kopczak, Lee, and Whang (1995) and Hammond and Morrison (1995). Because of globalization and the spread of outsourced logistics, this category has received much attention in recent years. However, we will define a separate category to examine issues specifically related to outsourcing and logistics alliances. Again, optimization models can be used here, as can spreadsheet models and qualitative analysis. Recent management literature has examined the changes within the logistics functions of many firms as the result of functional integration (Greis

and Kasarda (1997)) and the role of logistics in gaining competitive advantage (Fuller, O'Connor, and Rawlinson (1993)).

Inventory and forecasting includes traditional inventory and forecasting models. Many business school instructors had been teaching this material for years until, about ten years ago, it seemed to fall out of favor as qualitative approaches came to dominate operations courses. However, because of the advent of supply chain management, these models have reemerged in the classroom. Inventory costs are some of the easiest to identify and reduce when attacking supply chain problems. Students need to be facile with simple models that can identify the potential cost savings from, for example, sharing information with supply chain partners (Lee and Nahmias (1993)). Many schools teach some inventory theory before discussing broader supply chain issues. Of course there are many full texts on the subject such as Silver, Pyke, and Peterson (1998) and Graves, Rinnooy Kan, and Zipkin (1993)). Useful managerial articles focusing on inventory and forecasting include Davis (1993) and Fisher et al. (1994).

Marketing and channel restructuring includes fundamental thinking on supply chain structure (Fisher 1997) and covers the interface with marketing that emerges from having to deal with downstream customers (Narus and Anderson (1996)). While the inventory category addresses the quantitative side of these relationships, this category covers relationship management, negotiations, and even the legal dimension. Most importantly, it examines the role of channel management (Anderson, Day, and Rangan (1997)) and supply chain structure in light of the well-studied phenomena of the bullwhip effect (Lee, Padmandbhan, and Whang (1997)). These include, for example, issues related to pricing and trade promotions (Buzzell, Quelch, and Salmon (1990)) and

channel initiatives such as vendor managed inventory (VMI), coordinated forecasting and replenishment (CFAR), and continuous replenishment (Fites (1996), Waller, Johnson, and Davis 1999)). Because many of these initiatives involve channel partnerships and distribution agreements, this category also contains important information on pricing, along with anti-trust and other legal issues (Train (1998)). The opportunities for interacting with marketing faculty are, of course, the greatest here.

While marketing focuses downstream in the supply chain, *sourcing and supplier management* looks upstream to suppliers. Make/buy decisions (Venkatesan (1992), Carrol (1993), Christensen (1994), Quinn and Hilmer (1994), Kelley (1995), and Robertson and Langlois (1995)) fall into this category, as does global sourcing (Little (1995) and Pyke (1994)). The location category addresses the location of a firm's own facilities, while this category pertains to the location of the firm's suppliers. Supplier relationship management falls into this category as well (McMillan (1990) and Womack, et al. (1990)). Some firms are putting part specifications on the web so that dozens of suppliers can bid on jobs. GE, for instance, has developed a trading process network that allows many more suppliers to bid than was possible before. The automotive assemblers are developing a similar capability. Other firms are moving in the opposite direction by reducing the number of suppliers, in some cases to a sole source (Helper and Sako (1995) and Cusumano and Takeishi (1991)). Determining the number of suppliers and the best way to structure supplier relationships is becoming an important topic in supply chains (Cohen and Agrawal (1996), Dyer (1996), Fine (1998), Magretta (1998), and Pyke (1998)).

The *information and electronic mediated environments* category addresses long-standing applications of information technology to reduce inventory (Woolley 1997) and the rapidly expanding area of electronic commerce (Benjamin and Wigand (1997) and Schonfeld (1998)). Often this subject may take a more systems orientation, examining the role of systems science and information within a supply chain (Senge 1990). Such a discussion naturally focuses attention on integrative ERP software such as SAP (Whang and Lee (1995)), Baan and Oracle, as well as supply chain offerings such as i2's Rhythm and Peoplesoft's Red Pepper. To stay abreast of this rapidly changing field, many instructors supplement class readings with guest lectures from industry. Much of the teaching related to specific software is limited to developing an awareness of what the applications claim to do and the experience of firms that spend up to \$200 million to implement them. Finally, the many supply chain changes wrought by electronic commerce are particularly interesting to examine, including both the highly publicized retail channel changes (e.g. Amazon.com) and the more substantial business to business innovations (like the GE trading process network). It is here that we interface most directly with colleagues in information technology and strategy, which again creates opportunities for cross-course integration (Lee and Whang (1999)).

Product design and new product introduction deals with design issues for mass customization, delayed differentiation, modularity and other issues for new product introduction. With the increasing supply chain demands of product variety (Gilmore and Pine (1997) and Fine (1998)) and customization (McCutcheon, Raturi, and Meredith (1994)), there is an increasing body of material to cover. One of the most exciting applications of "supply chain thinking" is the increased use of postponed product

differentiation (Feitzinger and Lee (1997)). Here we find an interface with engineering and development, with clear implications for product cost and inventory savings.

Inventory models are often used to identify some of the benefits of these initiatives (Lee, Billington, and Carter (1993)). Also important are issues related to managing new product introduction and product rollover (Billington, Lee, and Tang (1998)). Many excellent cases illustrate these issues, and we find that students can easily identify with many of the examples.

The *service and after sales support* category addresses the critical, but often overlooked, problem of providing service and service parts (Cohen and Lee (1990)). Some leading firms, such as Saturn and Caterpillar, build their reputations on their ability in this area, and this capability generates significant sales (Cohen et al. (1997)). Some instructors teach inventory models for slow-moving items in this category.

Reverse logistics and green issues are emerging dimensions of supply chain management (Marien (1998)). This area examines both environmental issues (Corbett and van Wassenhove (1993) and Herslinger (1994)) and the reverse logistics issues of product returns (Padmanabhan and Png (1995), Clendenin (1997), and Rudi and Pyke (1998)). There are few teaching cases, and not many models available for this area (Fleischmann et al. (1997)). Nevertheless, because of legislation and consumer pressure, the growing importance of these issues is evident to most managers. Managers are being compelled to consider the most efficient and environmentally friendly way to deal with product recovery.

Outsourcing and strategic alliances examines the supply chain impact of outsourcing logistics services. With the rapid growth in third party logistics providers,

there is a large and expanding group of technologies and services to be examined. These include fascinating initiatives such as supplier hubs managed by third parties. The rush to create strategic relationships with logistics providers and the many well-published failures have raised questions about the future of such relationships. (See Bowersox (1990), SCMR (1998), and the news stories in Table 2.) In any case, outsourcing continues to raise many interesting issues (Cooper et al. (1997b)).

Metrics and incentives examines measurement and other organizational and economic issues. This category includes both measurement within the supply chain (Meyer 1996) and industry benchmarking (CLM (1994), PRTM (1997)). Because metrics are fundamental to business management, there are many reading materials outside of the supply chain literature, including accounting texts for instance. Several recent articles concentrate on the link between performance measurement and supply chain improvement (O'Laughlin (1997), Johnson and Davis (1998)).

Finally, *global issues* examines how all of the above categories are affected when companies operate in multiple countries. This category goes beyond country specific issues, to encompass issues related to crossborder distribution and sourcing (Arntzen et al. (1995)). For example, currency exchange rates, duties & taxes, freight forwarding, customs issues, government regulation, and country comparisons are all included. Note that the location category, when applied in a global context, also addresses some of these issues. As we mentioned earlier, there are several texts devoted to global management and a growing number of cases probe specific issues. Many recent articles also examine challenges in specific regions of the world (for example, for Asia see Lee and Kopczak (1997) or for Europe see Sharman (1997)).

Course Structure and Pedagogy

As with other courses, instructors are rapidly innovating in the classroom. In our survey, we observed many different teaching tools and approaches. In most business school classes, the overall approach is still case dominated, with more than half of the sessions dedicated to case discussions. Table 1 provides an extensive list of recent (since 1990) cases used by instructors to illustrate supply chain concepts. The cases are classified within our framework of twelve areas. Since many cases cover multiple areas, we limited the classification to 2-3 of the most important points. As can be seen from the table, there are some areas where cases are lacking – specifically in areas of service and after sales support, reverse logistics and green issues, outsourcing and strategic alliances, and metrics and incentives. Besides the listed cases, there are several texts that contain cases including Flaherty (1996), Dornier et al. (1998), and Cavinato and Young (1996). Additionally, the Council of Logistics Management (CLM) publishes cases related to logistics. To supplement case discussions, some instructors use recent business press stories to update issues in the case or to highlight emerging business trends. Table 2 provides a list of such news stories, again categorized within our framework. Another common supplement to lectures and cases is guest industry speakers, particularly for rapidly changing technology-based content.

Beyond the lecture and case format, many instructors use at least one game/simulation or interactive exercise. By far the most popular simulation is the Beer Game (Sterman (1989, 1992)). This game has a rich history, growing out of the industrial dynamics work of Forrester and others at MIT (Forrester (1961) and Jarman

(1963)). The game is so widely used, that in some cases, it is not used in supply chain electives simply because students have already played the game in an earlier class. There are many variants of the game including computer-based versions (Simchi-Levi, Kaminsky, and Simchi-Levi (1998) and Chen and Samroengraja (1997)) and Web-based versions (Jacobs (2000) and Porteus (1998)).

The Siemens Briefcase game is another supply chain game designed to be played by small groups (12-18 people) over an extended period of one to three days. The game illustrates many details of an order-based system with significant customization (Siemens (1996), Mehring, Kotler, and Kiesel (1997)). The Llenroc Plastics game (Jackson (1995)) is another more detailed simulation that can be played over several class periods. The Poster game is a simple game to illustrate the difficulties of forecasting and inventory planning for perishable goods (Johnson (1998b)). Finally, class projects are an important part of many courses.

Table 3 contains abbreviated class syllabi for several different supply chain classes and modules. All of these classes have been successfully conducted for four to five years, garnering high teaching ratings. These classes were chosen to show a range of treatments from both graduate business programs and engineering. As one would expect, engineering classes tend to be more technical with less reliance on cases. The last two examples show supply chain modules within other courses. In general, we can see most of the twelve key components of supply chain management in each of these courses. However, there is divergence in the treatment of the topics and their relative importance within the course. Least represented is material on reverse logistics and green issues, possibly because of the dearth of teaching material.

Conclusion

As we have shown, there is a wide and growing body of materials for teaching supply chain management. As with many areas in management education, however, very current cases on hot topics are always in short supply. Since supply chain concepts are so closely integrated with other functional areas, there is a vast set of topics to cover, and specific classes often concentrate on specific areas such as logistics, manufacturing, or marketing. Likewise, supply chain concepts are often taught by instructors in several functional areas including marketing, operations, and logistics. In the future, we expect supply chain issues to become increasingly important as eBusiness and globalization drive the need for closer functional integration. This will only serve to fuel the demand for supply chain education.

Table 1. Recent Cases in Supply Chain Management

	Location	Logistics	Inventory	Marketing	Sourcing	Information	Product Design	Service	Reverse SC	Outsourcing	Metrics	Global Issues
Case (School, Contact person or author)												
7-11 Japan (Stanford, 1997, Seungjin Whang)			•			•						
Amhall Paper Products (Stanford, 1997, Seungjin Whang)				•		•						
A Note on the U.S. Transportation Industry (HBS, 1995, Jan Hammond and J. Morrison)		•										
A Tale of Two Electronic Components Distributors (HBS, 1997, Bharat Rao and Ananth Raman)				•								
Alden Products - European Manufacturing (HBS, 1989/98)	•											•
Apparel Exports and the Indian Economy (HBS, 1995, Ananth Raman),					•							
Apple Computer's Supplier Hubs (Stanford, 1996, Laura Kopczak)		•								•	•	
Applichem (HBS, 1986, Therese Flaherty)					•						•	•
Barilla SpA (HBS, 1994, Jan Hammond)			•	•								
Baxter Healthcare: North American Supply Chain Management Experience (CLM, 1996, Kevin Boberg and Arnold Maltz)		•										•
Benetton (HBS, 1989, Howard Stevenson)			•				•					
Bose: JITII (HBS, 1994, Roy Shapiro)				•	•							
Bradco/Taylor (Tuck, 1999, Dave Pyke)	•	•										
Brueggers and Chesapeake Bakeries (Duke, 1997, Gerard Cachon)			•									
Burlington Northern (HBS, 1989, Jan Hammond)		•										
Campbell Soup: A Leader in Continuous Replenishment (HBS, 1994, Theodore Clark)			•	•								
Cummins Engine Co: Starting up "B" Crankshaft Manufacturing at the San Luis Potosi Plant (HBS, 1994, Robert Hayes)					•							•
Ergonomics, Inc (CLM, 1997, Omar Helferich and Robert Sroufe)		•							•			
Emerson Electric Co. ACP Division: The Fan Subpack Sourcing Decision (Darden, 1993, Keith Paige and Edward Davis)					•							•
Frito-Lay: The Backhaul Decision (HBS, 1992, Jan Hammond)		•										
General Appliance (Wharton, 1994, Morris Cohen)	•				•							

	Location	Logistics	Inventory	Marketing	Sourcing	Information	Product Design	Service	Reverse SC	Outsourcing	Metrics	Global Issues
Glu Lam (Tuck, 1993, Dave Pyke)			●									
Heineken Netherlands BV: Reengineering IS/IT to Enable Customer-Oriented Supply Chain Management (IMD, 1997, D. Marchand, T. Vollmann, K. Bechler)				●		●						
H.E. Butt Grocery Company: A Leader in ECR (HBS, 1991, Theodore Clark)			●	●								
Hewlett Packard Spokane Division: Order Fulfillment and Inventory Control (Vanderbilt, 1995, Eric Johnson)			●									
HP Deskjet Printer Supply Chain (Stanford, 1993, Hau Lee and Laura Kopczak)			●				●					
HP's da Vinci Project (Stanford, 1996, Glen Schmidt, Hau Lee, Seungjin Whang)						●						
HP Universal Power Supply (Stanford, 1997, Hau Lee)			●				●					
IBM After Sales Service (HBS, 1995, Andrew Dutkiewicz and Jan Hammond)								●				
Information Flows under SAP/R3 (Stanford, 1996, Seungjin Whang and Hau Lee)						●						
Intercon (HBS, 1991, K. Mishina and M. Flaherty)					●							
International Sourcing in Athletic Footware: Nike and Reebok (HBS, 1994, Philip Rosenzweig)					●							
Kodak Business Imaging Systems Division (HBS, 1992, Steve Wheelwright)					●							●
Laura Ashley and Fedex Strategic Alliance (HBS, 1996, Robert Anthony and Gary Loveman)		●								●		
LL Bean (HBS, 1993, Arthur Schleifer)			●									
Massimo Menichetti (HBS, 1988, Ramchandran Jaikumar)					●						●	
Mattel: Vendor Operations in Asia (Vanderbilt, 1998, Eric Johnson)	●											●
Merloni Elettrodomestici SpA (HBS, 1996, Jan Hammond)		●										
National Bicycle (Wharton, 1993, Marshall Fisher)							●					
National Wine and Spirits (A&B) (Vanderbilt, 1994/1998, Eric Johnson)	●											
Nike - Global Supply Chain (Stanford, 1998, Ann-Kristen de Verdier and Seungjin Whang)						●						●
Nike in China (HBS, 1993, Jame Austin)					●							●
Orange Juice Logistics: Oceana Fruit Juice Co. (Stanford, 1994, Seungjin Whang) and The Orange Juice Logistics Case Study Florida, Richard Beilock)	●											

	Location	Logistics	Inventory	Marketing	Sourcing	Information	Product Design	Service	Reverse SC	Outsourcing	Metrics	Global Issues
P&G - Wal-Mart (Darden, 1994, Mark Parry)				●								
P&G: Improving Consumer Value Through Process Redesign (HBS, 1995, Theodore Clark)				●								
Partnerships in the Supply Chain: Introducing Co-Managed Inventory at Guinness GB (CLM, 1998, Helen Peck)			●	●								
Pellton International: Partnerships or Tug of War? (UCLA, 1997, Charles Corbett and Luk van Wassenhove)					●							
Polaroid Europe (HBS, 1995, Afroze Mohammed)	●											●
Rosenbluth: Supply Chain Management in Services (Western Ontario, 1993, Allan Kamauff)					●	●						
Sara Lee: QR at Hanes (HBS, 1993, Benn Konsynski and Jiro Kokuryo)				●								
Saturn Corporation: Improving the Plant-Retail Link in the Auto Industry Supply Chain (CLM, 1996, Brian Gibson)		●										
Sof-Optics (HBS, 1991, W.E. Sasser, R. Jaikumar, D.C. Rikert)								●				
Sport Obermeyer (HBS, 1996, Ananth Raman)			●		●							
StWork (Northwestern, 1997, David Simchi-Levi)	●											
Supplier Management at Sun Microsystems (Stanford, Charles Holloway, David Farlow, Glen Schmidt, and Andy Tsay)					●							
Tenko (Stanford, 1997, Warren Hausman)							●					
The Jewel Box: A Life Cycle Case Study (CLM, 1996, Omar Helferich and Robert Sroufe)									●			
Tong Yang Cement (Stanford, 1997, Seungjin Whang, Hau Lee, Glenn Schmidt)			●									●
Toys "R" Us Japan (A&B) (CLM, 1996, Mark Kay)		●		●								
Toyota Motor Manufacturing, U.S.A., Inc. (HBS, 1995 K. Mishina, K. Takeda)					●							
Vandelay Industries (HBS, 1997, David Upton)						●						
Vanity Fair Mills (HBS, 1993, Robert Buzzell)				●								
Walls (China) Co., Ltd (CLM, 1997, Peter Gilmour)		●	●									●
Whelan Pharm. (Washington Univ., 1997, Panos Kouvelis)	●											●

Table 2. Supply Chain News Clippings

1. Location -

“Green is Good,” *Economist*, May 17, 1997.

“Shape of Supply Chain,” *Traffic World*, June 8, 1998.

“Texas Instruments’ Global Chip Payoff,” *Business Week*, August 7, 1996, 64.

2. Logistics and Transportation -

“Just Get it to the Stores on Time,” *Business Week*, March 6, 1995, 66.

“More Often, Delays and Snafus Grip America's Rail Freight,” *Wall Street Journal*, May 29, 1998.

“Logistics for Profit,” *Fortune*, April 1, 1996.

“Frito-Lay Devours Snack Food Business,” *The Wall Street Journal*, October 27, 1995.

“Logistics Revolution Spreads Stealthily,” *Chicago Tribune*, November 12, 1995.

“U.S. Questions Sales Practices at Frito Lay,” *Wall Street Journal*, Friday May 24, 1996.

“Next-Day Delivery: Cadillac Lowering Costs and Raising Satisfaction by Getting Cars to Consumers Faster,” *Chicago Tribune*, April 2, 1998.

“Delivering the Goods,” *Fortune*, November 28, 1994.

3. Inventory and Forecasting -

“Global Pile-Up,” *Economist*, May 10, 1997, 21.

“Burned By Busy Signals,” *Business Week*, March 6, 1995, 36.

“Capacity Boosts Take Toll on Many Firms,” *Wall Street Journal*, October 21, 1996.

“Hot Wheels,” *Business Week*, September 15, 1997, 56

“Autos: How Do You Get a Hot GMC Suburban? You Wait for a Computer to Dole One Out,”
Wall Street Journal, April 10, 1996.

“Publishing Industry's Focus Shifts To Limiting Returns,” *New York Times*, July 27, 1998.

“At Christmas, Retailers Are Like Kids Who Ask Santa Claus for a Pony,” *Wall Street Journal*,
October 27, 1997.

“Beetlemania Hits America Again Fueling Gray Market, Waiting Lists,” *Wall Street Journal*,
May 1, 1998.

“Tired of Renting 'Shanghai Surprise'? Blockbuster, Hollywood Hope to Help,” *Wall Street
Journal*, March 25, 1998.

“Sold Out: Corvette's 6-Speed Manual More Popular than Expected,” *Chicago Tribune*, April 12,
1998.

“Laptop Buyers Struggle with Shortages,” *Wall Street Journal*, November 20, 1996.

“Compaq Shuts Down Its Biggest Plant To Rid Inventory of Unsold Computers,” *Wall Street
Journal*, April 24, 1998.

“Market Place: Sales Gain for Sunbeam Is Costly to Investors,” *New York Times*, May 7 1998.

4. Marketing and Channel Restructuring-

“The Gap Plots Panty Raid on Victoria’s Secret,” *Wall Street Journal*, October 1, 1998.

“P&G, Seeing Shoppers Were Being Confused, Overhauls Marketing,” *Wall Street Journal*,
January 15, 1997.

“Some Companies Let Suppliers Work on Site And Even Place Orders,” *Wall Street Journal*,
January 13, 1995.

“Chain Reaction: Book Superstores Bring Hollywood-Like Risks to Publishing Business,” *Wall Street Journal*, May 29, 1997.

“In Publishing, Bigger is Better,” *New York Times*, March 31, 1998.

“PepsiCo Chief’s Stand on Exclusive Pacts Adds to Cola Wars’ Charged Atmosphere,” *Wall Street Journal*, May 15, 1998.

“How Magazines Make It to Stores -- And Why They Soon May Not”, *Wall Street Journal*, February 26, 1998.

“The Dumbest Marketing Ploy,” *Fortune*, October 5, 1992.

“Anheuser-Busch Chugs On Amid Probe of Distribution,” *Wall Street Journal*, March 9, 1998.

“New World, Ordered,” *INC*, (Solomon) December, 1995.

“The \$30 billion promise,” *Traffic Management*, December, 1993, J.A. Cooke.

“Efficient Consumer Responses,” *Food Processing*, February, 1994, F. Crawford.

5. Sourcing and Supplier Management

“Is this the Factory of the Future”, *New York Times*, July 26, 1998.

“Strange Bedfellows: Some Companies let Suppliers Work on Site and Even Place Orders,” *Wall Street Journal*, January 13, 1995.

“VW, Suppliers Work Side By Side, Seek Big Gains in Productivity, At ‘Factory of the Future’, in Brazil,” *Automotive News*, June 9, 1997.

Walton, M. “When Your Partner Fails You” *Fortune*, May 26, 1997, 151-154.

“How IBM Turned Around Its Ailing PC Division,” *Wall Street Journal*, March 12, 1998.

“GM, in Possible Blow to U.S. Steel Firms, Is Broadening Its Suppliers World-Wide,” *Wall Street Journal*, April 14, 1998.

“Gibson Greetings Plans to Outsource Manufacturing of Cards, Gift Wraps,” *Wall Street Journal*, April 1, 1998.

6. Information and Electronic Mediated Environments

“It’s a Wired, Wired World,” CFO, September 1997, 63-68.

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Table 3: Class Structures for a Selection of Successful Supply Chain Classes and Supply Chain Modules within Other Classes.

Stanford University, GSB (Winter 99, Whang/Lee) - Graduate Engineering/MBA Elective

<i>Session</i>	<i>Topic</i>	<i>Case</i>
1	What is Integrated SCM	
2	Information Distortion	
3	Inventory Models	
4	Countering Bullwhip	Barilla
5	Postponement	HP Deskjet
6	Product Universality	HP Network
7	Mass Customization	National Bike
8	Accurate Response	Obermeyer
9	Data-Driven SCM	Seven Eleven Japan
10	SCM Performance Measures	
11	SC Restructuring	Amhall
12	Supplier Hub	Apple Computer
13	Supply Chain Design	Mattel Inc.
14	Information and Logistics Restructuring	
15	E-Commerce and SCM	
16	Distribution Network	Polaroid
17	After Sales Service Support	
18	Right SC for Right Product/Time	
19	SC Integration	

Vanderbilt University (Fall 98, Johnson) - MBA Elective

<i>Session</i>	<i>Topic</i>	<i>Case</i>
1	Introduction	
2	Supply Chain Metrics	Guest Speaker
3	Inventory	HP:Spokane Division
4	Inventory Laboratory	
5	Mass Customization /Postponement	HP:Deskjet
6	Short Product Life	L.L. Bean
7	Global Facility Location	Mattel: Vendor Operations in Asia
8	Transportation and Distribution	
9	Distribution System Design	National Wine and Spirits: A
10	Distribution System Implementation	National Wine and Spirits: B
11	Product Introduction and Rollover	
12	Optimizing Logistics Flow	General Appliance
13	Information, EDI, and VMI	Vanity Fair Mills
14	Plant Trip – FedEx Midnight Sort	
15	Outsourcing logistics services (3PL)	Apple Computer
16	E-Commerce and Direct Distribution	

Ohio State University, (Spring 98, Cooper) - MBA Elective

<i>Session</i>	<i>Topic</i>	<i>Case</i>
1	Introduction	
2	Integration: Process and Function	
3	Interfirm Integration	Guest Speaker
4	Beer Game	
5	Beer Game Debrief	
6	Military Logistics	
7	Economics of Integration	Guest Speaker
8	Cost Issues	
9	Consulting in SC	Guest Speaker
10	Opportunities and Pitfalls	
11	Managing Components	
12	Changing Role of Purchasing & Sales	
13	Outsourcing	
14	Japanese Keiretsu	Guest Speaker
15	Reverse Logistics and Recycling	
16	GIS and Modeling	Guest Speaker
17	Symposium	
18	International Issues	
19	Future Perspectives	

Duke University (Fall 98, Cachon) - MBA Elective

<i>Session</i>	<i>Topic</i>	<i>Case</i>
1	Introduction	
2	Transportation	Frito-Lay
3	Incentives, Contracts & Legal Issues	
4	Postponement	HP:Deskjet
5	Managing Product Variety	Brueggers and Chesapeake Bakeries
6	Transit point and cross docking	Merloni SpA
7	Vendor Managed Inventory	Barilla
8	Accurate/Quick Response	Sport Obermeyer
9	Procurement/Supplier Management	Supplier Management at Sun
10	Outsourcing	
11	International SC	International Sourcing in Athletic Footwear
12	Electronic Commerce	

**Northwestern University (Fall 98, Simchi-Levi) - Graduate Engineering/MBA Elective,
Three-hour sessions (based on textbook - Simchi-Levi et al. (1998))**

<i>Session</i>	<i>Topic</i>	<i>Case</i>
1	Introduction, Information, and DSS	
2	Network Planning and Design	StWork Corp.
3	Inventory Management	Sport Obermeyer
4	SC Integration	Computerized Beer Game
5	Strategic Alliances and Outsourcing	Barilla
6	Product Design and Postponement	HP Deskjet

Penn State (Fall 98, Tyworth) – MBA Elective

1	Introduction and Strategy Overview	
2	Customer Service	
3	Collaborative Forecasting	Guest speaker
4	Beer Game	
5	Bullwhip Phenomenon, VMI	Barilla
6	Inventory - Stochastic Models	
7	Inventory - TPOP Models	
8	Transportation	Burlington Northern
9	Process Management/Transportation	Saturn Corp.
10	Mass Customization and Postponement	HP Deskjet
11	Third Party Logistics	Apple Computer
12	Global Logistics	Guest speaker
13	Information Technology	Guest speaker
14	Performance Measurement	
15	Future Perspectives	

Dartmouth College (Spring 99, Pyke)

– A supply chain module as part of a 18-session MBA elective on Manufacturing Strategy

<i>Session</i>	<i>Topic</i>	<i>Case</i>
1	Supply Chain Structure	National Bicycle Industrial Co.
2	Facilities Location; European country differences	Alden Products, Inc.
3	Manufacturing in Asia; Currency Fluctuations	Mattel – Asia Manufacturing
4	Distribution Strategy	Bradco/Taylor
5	Third party logistics	Apple Supplier Hub
6	Postponement and Inventory	Hewlett Packard Universal
7	Supply Relationships	Intercon Japan
8	Supply Chain Restructuring	Massimo Menichetti
9	Lecture on Supply Relationships	

Wharton (Spring 99, Cohen and Ellison)

– Supply chain treatment in a 12-session core MBA class on Operations Strategy

<i>Session</i>	<i>Topic</i>	<i>Case</i>
1	Introduction	
2	Matching Capacity to Demand	General Appliance
3	Supply Chain Simulation	Beer Game
4	Beer Game Debrief	
5	Vendor-Managed Inventory	Barilla Pasta
6	Inventory Management: Lecture	
7	Applications of Inventory Management & Postponement	Hewlett Packard Deskjet
8	Mass Customization	National Bicycle
9	Accurate Response	Sport Obermeyer
10	Yield Management	Piedmont Airlines
11	Product Development	Cyclone Grinder
12	Concurrent Design Lecture	

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