

OM386: Supply Chain Management
Spring 2007: Unique No: 03885
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COURSE DESCRIPTION

Supply Chain Management involves the flows of materials and information among all of the firms that contribute value to a product, from the source of raw materials to end customers. Elements of supply chain management have been studied and practiced for some time in marketing, logistics, and operations management. We will attempt to integrate these different perspectives to develop a broad understanding of how to manage a supply chain. The course will place a heavy emphasis on developing analytical tools and conceptual frameworks for managing supply chains. Specific issues that will be discussed include: forecasting, demand management, logistical networks, inventory management, supplier contracting, sourcing, information technology, flexibility, globalization, and performance measurement.

By the end of the course, you should have developed an appreciation for the challenges in managing a supply chain and the ability to use some analytical tools and conceptual frameworks.

TEACHING/LEARNING METHODOLOGY

The detailed course outline starting on page 6 lists, for every class session, the reading(s), case(s), assignment(s), and anything else of importance. Please read this outline carefully before every session.

Because class time is our most precious and inelastic resource, **please come to every class prepared.**

Essential preparation includes reading the assigned readings and cases and doing the assignments.

Text Book (C&M) Chopra, Sunil and Peter Meindl, *Supply Chain Management*, Third Edition, Person Education, Inc., Upper Saddle River, NJ, 2006.

Course Pack Additional reading materials for the course are contained in a bulk pack that should be available for purchase at the University Co-op.

Course Notes To support the lectures and case discussions, I will occasionally post notes on the web page. These notes are intended to help you when you are reviewing the material that has been covered in class. They are not intended to be a substitute for attending class.

Teamwork An important element of this class is teamwork. You will compete as a team in two supply chain simulation games. In addition, I encourage the formation of study groups to maximize learning.

Homework The purpose of homework assignments is to provide learning reinforcement and promote class preparedness. You will find that the homeworks provide excellent learning feedback and are a confidence-building tool. The assignments will also help with your preparation for the exam.

Class Participation To foster a productive learning environment, it is important that everyone come to class prepared and willing to contribute to discussion. Ideally, you will make concise, insightful, and eloquent comments in every class. However, I also recognize the importance of making smaller contributions, including asking good questions. I believe that the learning environment is best when the discussion is not dominated by a few, but moved along incrementally by all of us. Do not be afraid to make points that you may regard as minor, ask clarifying questions, or otherwise contribute in small ways.

Feedback Your informal feedback is very important to me. Please let me know throughout the semester if there is anything I can do to make this class better for you.

PERFORMANCE EVALUATION

The performance criteria are weighted as follows:

Exam	30%
Individual Homework	20%
Executive Summaries	20%
Supply Chain Game #1	8%
Supply Chain Game #2	12%
<u>Class Participation</u>	<u>10%</u>
Total	100%

The expected course grade distribution is: $A \leq 40\%$; grades lower than B $\leq 10\%$. Grades lower than B will be assigned on a case by case basis.

Exam

There will be one comprehensive exam, designed primarily to examine your ability to use the analytical tools that we will study in class.

Individual Homework

To facilitate your understanding of some of the analytical tools that we will be learning, there will be several, problem solving homework assignments. The purpose of homework is to facilitate your learning. On occasion, I expect that you will find that you do not quite know how to do a particular assignment. In such situations, you should give it your best shot. It is only by struggling through a few such situations that you develop problem solving skills.

Individual Executive Summaries

For several of the cases that we will be discussing, I will assign an executive summary, in which you will be asked to analyze a specific issue in the case and make a recommendation. In general, an executive summary should accomplish several things:

- Articulate the operational problem in terms of how it affects important measures of the firm's performance.
- Identify and analyze the major alternatives.
- Present a persuasive argument for a particular course of action.

A brief description of an executive summary and a couple of examples are provided at the end of this document. Please restrict yourselves to **one page** of text in your executive summaries (additional pages may be attached for exhibits). You may use single-spacing, but please use a reasonable font size, i.e. at least 11 pt.

Supply Chain Game: During the semester we will do two supply chain simulation games in which you manage a computer simulated supply chain. In each game we will simulate two years of operations in about one week of real time. We will play the game of teams of 3-4 students. Following each simulation, your team will turn in a brief write-up outlining the analysis that you did to support the decisions that you made and explaining, in retrospect, what you might have done differently. Specific instructions for the write-up will be provided for each game. Grades will be based on both your write-up and your team's performance in the game.

Individual and Group Work

Each student is to prepare his own paper for each individual homework and each executive summary. My philosophy is that the process of composing the paper is a valuable part of the learning process. (In fact, for the executive summaries, one of the skills that I want for you to develop is that of organizing your thoughts so that you can present a concise, logical analysis that leads to a recommended course of action.) However, I also believe that students can learn a lot from one another. Therefore, I encourage you to discuss the homework and executive summary assignments with one another before you sit down individually to prepare the paper that you will submit. Note that Xerox copies would not be consistent with this approach.

Grading

All of the homework and executive summary assignments will be graded on a scale of 0-4. Please turn in all assignments at the beginning of the class session listed on the schedule. Solutions to the homework assignments will be distributed in class or on the web-page. Please study each solution carefully even if you received full credit on the assignment. **I do not accept the submission of written assignments after class on the day that they are due.** However, I do allow students to drop one homework grade.

HONOR CODE

By teaching this course, I observe all of the faculty responsibilities with regard to the Honor System. By enrolling in this class, you have agreed to observe all the student responsibilities with regard to the Honor System

Please do not use any materials (packet of overheads, homeworks, course notes, handouts, exams, homework solutions, case summaries) from previous semesters or from other sections of the course being offered in this semester unless the same has been made available by me to every one of your fellow students in this class. If the application of the Honor System to this class and its assignments is unclear in any way, it is your responsibility to ask me for clarification. Many thanks in advance for your cooperation and assistance.

ADDITIONAL POLICIES

The University of Texas at Austin provides upon request appropriate academic accommodations for qualified students with disabilities. If you have a condition (e.g. learning disability, chronic medical condition, etc.), of holiday that needs accommodation, please see me early in the semester so that we can take appropriate step. For additional information about the University's policies, contact the Office of the Dean of Students at 471-6259 or 471-4641.

The following is a summary of the sessions in the course. A detailed outline follows.

OM 386	SUPPLY CHAIN MANAGEMENT
Spring 2007	Course Outline
	Gilbert

Session	Day	Date	Topic	Case / Other Info.	Assignments Due
1	W	1/17	Introduction to Supply Chain Management		
2	M	1/22	Process Flows and Cycle Stocks		
3	W	1/24	Process Flows and Cycle Stocks	Stafluff	IH#1
4	M	1/29	Capacity and Seasonal Stocks		
5	W	1/31	Coordination of Process Flows	Johnson Elevators	IH#2
6	M	2/5	Optimization of the Supply Chain	Medical Technologies	
7	W	2/7	Optimization of the Supply Chain Guest	Good Tire	IH#3
8	M	2/12	Speaker – Gregg Mitchell – Glazers		
9	W	2/14	Optimization of the Supply Chain	American Steel	IH#4
10	M	2/19	Coordination of Production / Marketing	Cross River	ES#1
11	W	2/21	Forecasting		
12	M	2/26	Forecasting		
13	W	2/28	Information Flow	Barilla Pasta	
14*	M	3/5	Introduction to the Supply Chain Game		
15*	W	3/7	To be Announced		
16	M	3/19	Replenishable Inventory	Data for SC Game 1	
17	W	3/21	Replenishable Inventory		
18	M	3/26	Distribution Systems	Crystal View	IH#5
19	W	3/28	Industry Speaker – Alexis Takvorian (Dell)	SC Game1 Begins	
20	M	4/2	Virtual Warehousing (Cross Docking)	Merloni	
21	W	4/4	Uncertainty and Inventory - single period	SC Game 1 Ends	
22	M	4/9	Uncertainty and Inventory - single period	Video Vault	IH#6
23	W	4/11	Uncertainty and Inventory - single period		SC Game1 Write-up
		4/13	Optional Review Session, 10 a.m.-noon	Location TBA	
24	M	4/16	Exam	Data for SC Game 2	
25	W	4/18	Industry Speaker –Chris Braun (Frito Lay)		
26	M	4/23	Capacity Investment for Flexibility	Seagate Technologies SC Game 2 Begins	ES#2
27	W	4/25	Supply Chain Design for Flexibility		
28	M	4/30	Flexibility Issues in Product Design	HP Universality SC Game 2 Ends	
29	W	5/2	Course Wrap-up		SC Game 2 Write-up

** Global Trip Period

OM 386: DETAILED COURSE OUTLINE

SESSION 1 (W, Jan. 17) Reading	Introduction to Supply Chain Management Chopra and Meindl (C&M): Chapter 1
SESSION 2 (M, Jan. 22)	Process Flows and Cycle Stocks
SESSION 3 (W, Jan. 24) Reading: Homework Submitted	Process Flows and Cycle Stocks, Cont. C&M: pp. 261-269, 294-297 IH#1: Stafluff
SESSION 4 (M, Jan. 29)	Capacity and Seasonal Stocks
SESSION 5 (W, Jan. 31) Case Reading Homework Submitted	Coordination of Process Flows Johnson Elevators C&M: pp.275-278, Skim pp. 281-290 IH#2: Johnson Elevators
SESSION 6 (M, Feb. 5) Reading:	Optimization of the Supply Chain Medical Technologies Fundamentals of Optimization Models: Linear Programming (Read pp. 63 – 84, the remainder of the chapter is beyond the scope of this course but may be of interest to some students.)
SESSION 7 (W, Feb. 7) Reading: Homework Submitted	Optimization of the Supply Chain Good Tire IH#3
SESSION 8 (M, Feb. 12)	Guest Speaker – Greg Mitchell - Glazers
SESSION 9 (W, Feb. 14) Reading: Turn in:	Optimization of the Supply Chain American Steel IH#4
SESSION 10 (M, Feb. 19) Case: Reading Exec. Summary Submitted	Coordination of Production and Marketing Cross River Products C&M: Skim Chapter 8 ES #1
SESSION 11 (W, Feb. 21) Readings:	Forecasting C&M: Chapter 7
SESSION 12 (M, Feb. 26) Readings:	Forecasting, Cont. C&M: Chapter 7
SESSION 13 (W, Feb. 28) Readings:	Coordination and Information Flow C&M: Chapter 17

SESSION 14* (M, Mar. 5) Reading	Introduction to the Supply Chain Game See Blackboard
SESSION 15* (W, Mar. 7)	
SESSION 16 (M, Mar. 19) Readings Supply Chain Game	Replenishable Inventory C&M: Chapter 11 Assignment #1 – Data becomes available
SESSION 17 (W, Mar. 21)	Replenishable Inventory
SESSION 18 (M, Mar. 26) Case: Reading Homework Submitted	Distribution Systems Crystal View Note on Logistics IH#5: Crystal View
SESSION 19 (W, Mar. 28) Supply Chain Game	Industry Speaker – Alexis Takvorian – Dell Computer Assignment #1 - Game Begins
SESSION 20 (M, April 2) Case: Reading:	Virtual Warehousing Merloni Elettrrodomestici SpA: The Transit Point Experiment Crossdocking: Just-in-Time for Distribution (Gue)
SESSION 21 (W, April 4) Readings: Supply Chain Game	Demand Uncertainty and Inventory – Single Period C&M: Chapter 12, pp. 346-354 Assignment #1 - Game Ends
SESSION 22 (M, April 9) Case: Homework Submitted	Demand Uncertainty and Inventory – Single Period, Cont. Video Vault IH#6: Video Vault
SESSION 23 (W, April 11) Submitted	Demand Uncertainty and Inventory – Single Period, Cont. Supply Chain Game 1 Write-up
Optional Review (F, Apr. 13)	Optional Review Session, Time TBA
SESSION 24 (M, April 16) Supply Chain Game	Exam Assignment #2 – Data becomes available
SESSION 25 (W, April 18)	Industry Speaker
SESSION 26 (M, April 23) Case Exec. Summary Submitted Supply Chain Game	Capacity Investment for Flexibility Seagate Technologies: Operational Hedging ES #2 Assignment #2 – Game Begins
SESSION 27 (W, April 25) Readings	Flexibility Principles on the Benefits of Manufacturing Process Flexibility Designing Global Strategies: Profiting from Operational Flexibility

SESSION 28 (M, April 30)

Case:

Supply Chain Game

Flexibility Issues in Product Design

HP Universality

Assignment #2 – Game Ends

SESSION 29 (W, May 2)

Submitted:

Course Wrap-up

SC Game 2 Write-up

THE EXECUTIVE SUMMARY

An executive summary is a short (usually one page or less) synopsis of a report. This summary serves different purposes: for some readers, it previews the report, while for others it replaces the full report. By providing essential points in an easily accessible form, it helps the busy executive decide whether to read the whole report, or simply the summary. Because readers will see the summary first, it must engage their attention and make a good impression. For this course, please limit yourselves to **one page of text**. Additional pages may be attached as exhibits.

STRUCTURE

Executive summaries may take different forms depending on the nature of the report and on company practices. Whatever the form, the opening sets the context and scope of the investigation. It reminds readers of why the investigation took place and why it is significant to them, as well as spelling out the limits to the study. After the opening, material may be organized in either of two general patterns, one more traditional and the other more direct.

The more traditional summary frequently explains the method of investigation, especially if it is controversial or of great interest to readers. It then presents the report's major findings and conclusions. Finally, it states the recommendations emerging from the study. Thus, as in the first example (see page 2), it states the recommendations only after presenting the rationale behind them

The more direct, hard-hitting structure presents the recommendations immediately after the opening. Then it backs them up with supporting facts and reasoning. All recommendations may be presented together, followed by a section entitled "Basis for Recommendations," or each recommendation may be followed by relevant support. The second example (see page 3) highlights, then supports, each recommendation.

A suitable ending, using either of these structures, might include procedures and/or a time frame for implementing the recommendations.

TIPS FOR WRITING

The key point to remember in writing the executive summary is to focus on important data, conclusions, and recommendations. Avoid including excessive background and detail. One manager who sometimes had trouble writing the executive summary discovered a technique that helped: He imagined that he and his boss got on the elevator on the 25th floor and rode down to the lobby. His boss would remark, "I just received the report on the new marketing plan. What's it all about?" The manager would—in the time it takes an elevator to descend 25 floors -- give his boss the rationale, findings, and recommendations of the report. Depending on how tall your building is -- or on how fast or slow the elevators are—you may want to try this technique to help frame your summary.

Example 1

EXECUTIVE SUMMARY

Introduction: BMW and other luxury car manufacturers face a threat from the Japanese entry into the high end segment of the automobile market. Although BMW's share has not yet been affected, the threat is real, especially due to the lower prices, better quality and shorter lead times for new product introductions by the Japanese. Although it takes BMW six years to launch a new product, the Japanese can do it in four. This difference is due to the fact that the Japanese introduce incremental changes frequently, while BMW made big changes infrequently. However, because the Japanese manufacturers have to commit to the final design of a car much further in advance, they lose the flexibility to make last minute design changes. It has been proposed that BMW adopt a prototyping system more like that of the Japanese, by requiring design decisions to be locked in 12 months prior to each prototype in order to allow pre-production grade tooling to be used in the construction of each set of prototypes.

Analysis: The major advantage of BMW's current prototyping approach is that it affords maximum flexibility in the design process. The iterative process enables learning from one cycle to be incorporated into the next. This means that BMW can make changes relatively late in the design cycle. Not only does this allow them to respond to the changing tastes of the market, it also allows them to incorporate technological breakthroughs into their products, enhancing their reputation as a technological leader.

Advantages of proposed approach:

- Improved product quality at launch.
- Using actual materials bought from actual suppliers will lead to a more accurate prototype testing.
- Use of pre-production tools enables BMW to discover tooling or parts' problems earlier in the product development cycle. Also by procuring parts from suppliers at the prototype stage, any incompatibility issues with parts can be identified earlier.
- Using plant workers for the final prototype more closely approximates the actual assembly line operations.
- The new approach would speed up the ramp-up and pilot processes due to production problems being identified earlier, and it will allow them time for fine tuning.
- Lower warranty expenses due to improved quality of products at launch.

Disadvantages of proposed approach

- Higher tooling costs
- Loss of flexibility in design commitment for each prototype build cycle.

Recommendations: In adopting the new prototyping approach BMW will have to trade off flexibility and vehicle quality. While the ability to make design changes later is important to keep up with changing consumer demands, the higher quality levels of the Japanese vehicles are a bigger threat. BMW can balance both these issues by:

- For now, use the new approach for the cockpit design. Since the cockpit seems to be the area where design and manufacturing quality matter the most, it would benefit from the new approach. They should use this opportunity to evaluate the costs and benefit of the new approach.
- However, in general they should adopt this approach only in the last one or two batches of the prototype development cycle rather than adopting it from the first batch of prototypes. This would minimize the investment needed in pre-production tools and still offer us enough opportunities to identify problems before the pilot stage.
- They should assess each of the 30 major subsystems regarding the relative importance of design flexibility versus conformance quality at launch. The new approach should be used only for those subsystems in which conformance quality is judged to be more important than design flexibility.

Although there is incremental investment required for the new prototyping approach, the overall savings from all 3 stages (Prototyping, Pilot and Ramp-up) will more than justify these investments.

Example 2

EXECUTIVE SUMMARY

For the past several months our inability to meet the demand for 4200 terminals has created long shipping delays for our large computer systems which use the 4200. Customers for these systems, our most important product, have complained about the long waits. While production will be increased when the new plant begins producing the terminals in April, the problems may alienate some important customers before then. Because several of our competitors have recently introduced products that closely rival the 4200, the current length of backlog may encourage our customers to adopt other computing products. Consequently, the Inventory Department studied the situation to recommend short-term measures to ease the backlog.

RECOMMENDATIONS FOR EASING SHORTAGE OF 4200 TERMINALS

Replace the 4200s with 426s for most internal uses. In the next six months about 250 of the 4200 terminals are slated to be shipped to various plants for internal use. While we do not want to speed up external delivery at the expense of creating massive internal inefficiencies, our study shows that many of these 4200s can be replaced by our older and more plentiful terminals with a minimum of inconvenience to the internal users. Internal users who cannot use 426s may be asked to accept delays in shipment of the 4200s. This step should free up at least 200 terminals for our customers' systems.

Route 4200s directly to North Carolina for assembly. Now all 4200s are routed from the St. Louis plant, where they are manufactured, to North Carolina, where the large systems are assembled, by way of the inventory warehouse in Jacksonville. By routing all of the terminals directly to North Carolina, we can gain two weeks and eliminate some of the backlog of orders. Those few 4200 terminals still needed internally can then be shipped from North Carolina to their destinations.

IMPLEMENTATION

These recommendations should be acted upon by November 30, 1983, to ease the shortage.

Source: Maryann V. Piotrowski, Re: *Writing*