**MGT6401 Supply Chain Modeling**

**Course Syllabus**

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The primary challenge for any firm, from an operations perspective, is to match supply and demand in the most cost effective way. Over the past decades, matching supply and demand has become increasingly challenging because today’s competitive marketplace may require firms to rely on other firms for inputs in the final products, therefore limiting the firm’s ability to streamline its operations. The main focus of Supply Chain Management is to overcome these limitations. In other words, Supply Chain Management is concerned with the design and management of value added processes that take place across organizational boundaries with the goal of matching supply and demand in the most cost effective way.

The objective of the course is to provide students with tools/means for matching supply and demand in the most cost effective way. A mixture of lectures, case discussions and games will be used to provide a better understanding of supply chain issues.

**Course Material**

There is no required textbook for this course. A required class pack containing the material will be made available through the HOA office. .Some optional reading is listed below

1. Textbook or Reference Book: Designing and Managing the Supply chain: Concepts, Strategies, and Cases by David Simchi-Levi and Philip Kaminsky.
2. The Resilient Enterprise: Overcoming Vulnerability for Competitive Advantage by Yossi Sheffi
3. **Clockspeed: Winning Industry Control in the Age of Temporary Advantage** by Charles H. Fine.
4. Supply Chain Management Best Practices by David Blanchard
5. Store Wars: The Battle for Mindspace and Shelfspace by Judith Corstjens and Marcel Corstjens

**Grading Policy**

Written Case Analyses 30% (3@10%) -group

Supply Chain Simulation Games 10% -group

Class Participation 30% -individual

Final Project 30% -group

*Written Case Analyses*

You will have three group case write-ups which will make up 30% of your course grade. Each case write-up is worth 10% of your course grade. You should form *groups of three* *to four* to work together for the case write-ups, simulation games and the final project. For each case analysis, the detailed course outline in this syllabus provides a list of questions to be answered in your case write-up. Concentrate explicitly on these questions, providing detailed analysis and/or discussion.

All case write-ups are limited to 4 pages. The write-ups should be double-spaced, 12 pt. font, 1 inch margins all around. A cover page with the names of the group members does not count toward the 4 page limit.

*Supply Chain Simulation Games*

You will play two supply chain simulation games in this course. Both games are to be played in groups. Each game will make up 5% of your total grade and you will be graded based on your performance as compared to the other teams playing the game. The start and end times for the games will be announced in class.. You will be given access to the games 48 hours prior to the game start to view the historical data so that you can forecast demand and develop a game strategy.

*Class Participation*

A brief summary of each session as well as discussion questions for each class are provided in the detailed course outline which is at the end of the syllabus. You are expected to read the relevant case and/or article for each session and think about the discussion questions before each session. Your class participation grade will primarily depend on the quality of comments made during case discussions. Quality of participation, i.e. insightful comments or questions, is much more important than quantity.

To earn class participation credit you must be **on time** and **sit in your assigned seat** (determined in the second class) behind your name tag.

*Final Project*

The projects are to be done in groups. The project is an opportunity to focus on an area of interest or importance to you. Several types of projects are possible:

1. Examine an industry or a firm with respect to its supply chain developments over time. Discuss the reasons for change, the process by which restructuring has occurred and the current status of the supply chain structure and viability. Conclude with a vision for the future.
2. Consider an enabling technology (e.g., RFID technology) and discuss its impact on supply chain structure, cost, competition, etc. You can either discuss one industry in detail or do a comparative analysis across industries.
3. You can pick one of the books in the optional readings list and do a critical review of the book.
4. Undertake a small “consulting” assignment for a company. This can be an existing company who faces supply chain management challenges, or the design of a supply chain for a startup. In the former case, discuss the industry characteristics, current status, the reasons driving the company to restructure and conclude with recommendations. In the latter case, discuss the operating environment in more detail and make a recommendation on supply chain design. In this type of project, the recommendations and the discussion should constitute approximately half the report.
5. For the entrepreneurs, this might be an opportunity to lay out an operations plan for a new supply chain.

The projects are not limited to above topics; the projects could be on anything related to supply chain management. If you have difficulty in deciding on a project topic, I can suggest some potentially good project themes. Please come and see me during the first or second week of the course if you need some help on the project.

The final project will have three components: the project proposal, the project presentation, and project report. Each group is expected to submit a short project proposal. The project proposal should include a short description of the problem on which your group will be working. The project presentations will take place on the last two sessions of the course (2/16 and 2/18). The project report is due for the last session. The project reports should be no more than 6 pages (1 inch margins, 12 point font, double spaced), followed by supporting exhibits. Your project grade will be based on four components: (20%) *breadth and depth of research* (the quantity and quality of material you find concerning your topic); (10%) *quality of analysis*; (20%) *quality of writing*(including proper citations);and (50%)*quality of class presentation*.

**Class Outline**

**Session 1: Introduction**

**Session 2: Supply Chain Basics: Matching Supply and Demand**

* Reading: Making Supply Meet Demand in an Uncertain World, HBR
* Reading: What is the Right Supply Chain for your Product, HBR
* Reading: The Triple A Supply Chain, HBR

**Session 3-4: Forecasting**

Lecture.

**Session 5: Supply Chain Modeling**

Basics of Inventory Management

**Session 6: Supply Chain Modeling**

Introduction to Simulation

**Session 7: Supply Chain Modeling**

Inventory Modeling using @Risk

**Session 8: Supply Chain Modeling**

Seasonal Demand

**Session 10: Supply Chain Modeling**

Fixed-Ordering Costs

**Session 11: Retail Supply Chains: Competitive Advantage**

* Reading: The Bullwhip Effect in Supply Chains, SMR
* Reading: Rocket Science Retailing is Almost Here: Are you ready? HBR
* Reading: Vendor-Managed Inventory in retail supply chain, Journal of Business Logistics (1999)

Discussion Questions:

1. What makes it particularly difficult for the retailers to manage their business?
2. What are Wal-Mart’s sources of competitive advantage? Focus on competitive advantages from operations perspective (i.e., procurement, distribution, product assortment, and pricing).

**Session 12: Retail Supply Chains: Disruptive Technologies**

* Case: Marks Spencer and Zara, INSEAD case
* Reading: Rapid-Fire Fulfillment, HBR
* Reading: Disruptive technologies: Catching the wave, HBR
* Reading: Meeting the Challenge of Disruptive Change, HBR

Case Preparation Questions:

1. What is innovative about Zara? What are the major differences in Zara’s supply chain when compared with that of M&S?
2. Why is it so difficult for M&S to start playing the “fashion” game? What do you think of the programs launched by Peter Salsbury in response to the troubles at M&S?
3. What, if any, guidance would you offer for turning M&S around?
4. Compare M&S’s approach to that of Inditex, Zara’s parent company?

**Session 13: Supply Chain Coordination**

Lecture: Incentive Alignment in the Supply Chain: Supply Chain Contracts.

* Reading: Returns policies: make money by making good, SMR
* Reading: Aligning Incentives for Supply Chain Efficiency, HBR
* Reading: Turning the Supply Chain into a Revenue Chain, HBR

**Session 14: Supply Chain Coordination:**

* Case: Hamptonshire Express, HBS case

**Session 15: Capacity Management**

Discussion: Beer Game

* Reading: The Bullwhip Effect in Supply Chains, SMR

**Session 16: Supply Chain/Network Design**

Designing for Product Variety (Postponement)

* Case: HP DeskJet Printer, Stanford Case
* Reading: Mass customization at Hewlett-Packard: the power of postponement, HBR
* Reading: The limits of mass customization, Sloan Management Review
* Reading: The four faces of mass customization, HBR

Discussion Questions:

1. What caused the so-called Inventory/Service “Crisis” at HP?
2. What are the pros and cons of the following proposals mentioned in the case: a European factory, better forecasting, more inventory.
3. Assess quantitatively the air freight option relative to current operations. Just consider the products for the European market. Use the following assumptions:
   * HP wants to minimize inventory while still achieving at least a 98% fill rate.
   * The lead time from Vancouver to Europe is 5 weeks by the current method (ocean) but 1 week by air.
   * HP orders and receives inventory on a weekly basis.
   * There are 4.33 weeks per month and demand is independent across time.
   * The product sells for $667 and the production cost is roughly $400.
   * Inventory carrying costs are 24% per year.
   * Shipping via sea (the current operation) costs $10 per printer, whereas air freight costs $25 per printer.
4. Use the same assumptions and model to evaluate the inventory savings associated with a generic European product that would be assembled-to-order in the European Distribution center.
5. How would the different alternatives available to Brent affect the supply chain? How would you expect the different stakeholders felt about this proposal? If you were Brent Cartier, what would you recommend? How would you sell your recommendation to the many different organizations involved?

**Session 17: Supply Chain/Network Design**

B2C Models in Internet Retailing: Shop online, not inline

* Case: Peapod Case, Kellogg case
* Reading: Which e-Business is Right for Your Supply Chain, Supply Chain Management Review
* Reading: Online Grocer Peapod Feels Chill of Its Rivals’ Failures, WSJ, July 23, 2001
* Reading: Amazon Prospers on the Web by Following WalMart’s Lead, WSJ, November 22, 2002

Discussion Questions:

1. What are the pros and cons of the different Internet strategies?
2. What drives profit performance in this business? Identify key drivers.
3. What is the “shortest path to profitability”, if one exists? Which key metrics would you watch and benchmark?

**Session 18: Supply Chain/Network Design**

Logistics Network Design and Logistics Outsourcing.

* Case: Merloni Elettrodomestici SpA: The Transit Point Experiment, HBS case

Discussion Questions:

1. What is the transit point proposal?
2. Who are the stakeholders?
3. What are the costs and benefits of the transit point approach?
4. What do you think Merloni should do about the transit point experiment?

**Session 19: Project Proposals**

**Session 20: Supply Chain/Network Design**

Global Capacity Management: Use of Operational Hedging

* Case: Seagate Technologies: Operational Hedging, Kellogg case
* “Exploiting Uncertainty,” Business Week, June 7, 1999.

Case Preparation Questions:

1. What is Seagate’s corporate strategy? Describe and evaluate how its operations and processes support the corporate strategy. Critically evaluate Seagate’s product and process development strategy, which calls for development in its respective product/process center in the U.S. and then exporting the developed process to a site in the Far-East for high-volume production.
2. What are Seagate’s major risks? How does it manage those risks?
3. How would you describe the “capacity of the processing network” if the current Capital Appropriation Request capacity proposal was to be implemented? What is the expected profit and ROI under this investment? (Given the short product life, assume the firm is making its decisions for a single time period of length one year, at the end of which manufacturing capacity will have zero salvage value)
4. The case states that the true demand forecast contains uncertainty. Given this forecast, recommend a capacity portfolio that is better than the current Capital Appropriation capacity proposal. (Recall, capacity investment must be performed before you observe actual market demand.) Explain why your recommended portfolio is better than the current capacity plan.

**Session 21: Supplier Management**

Supplier Management (Arm’s Length vs. Strategic Partnership Models)

* Case: Supplier Rationalization at Barclays (A), INSEAD Case
* Reading: Strategic Sourcing: From Periphery to the Core, HBR
* Reading: Building Deep Supplier Relationships, HBR
* Reading: How to think strategically about outsourcing, HBR

Discussion Questions:

1. Make a qualitative assessment of Barclays’ print supply chain status and needs.
2. Which of the three options (proposed in the opening) would you recommend? Why? Discuss the pros and cons relative to short and long-term performance needs.
3. What other directions would you recommend exploring to improve the print supply chain?

**Session 22: Inventory Record Inaccuracy: Causes and Implications**

Lecture: TBA

**Session 22: Individual and Social Preferences for SC Decisions**

Lecture. Risk Aversion, Loss aversion, Ambiguity Aversion Games.

**Session 23: Individual and Social Preferences for SC Decisions**

Lecture: Social Preferences. Status Games

* Reading: Are your engineers talking to one another when they should? HBR

**Session 24: Closed Loop Supply Chains**

Lecture

**Session 25: Closed Loop Supply Chains**

* Case: Managing Product Returns at HP. INSEAD Case.

**Session 26: Reverse Logistics**

* Case: Cycleon: Postal Networks for Reverse Logistics. INSEAD Case.

**Session 27-28: Project Presentations**