NEW YORK UNIVERSITY
Leonard N. Stern School of Business
MBA Program

TECHNOLOGICAL INNOVATION
&
NEW PRODUCT DEVELOPMENT

B60.3356.30

Spring 2004

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KEY DEADLINES FOR THIS COURSE
Every Session: Class Contributions
As Indicated Below: Homework
Take-Home Final Exam: Due back via email by 9 p.m. one week after last class

January 20, 2004
COURSE MATERIALS

Readings and Cases
1. Disruptive Technologies: Catching the Wave.
3. The Art of Standards Wars.
5. Transformative Capacity: Continual Structuring by Intertemporal Technology Transfer.
7. Strategy as a Portfolio of Real Options.
8. Scientific Management at Merck: An Interview with CFO Judy Lewent.
12. Technological Choices and the Inevitability of Errors.
15. Case: Team New Zealand (A).
20. Creating Project Plans to Focus Product Development.
22. Developing Products on Internet Time.

Additional Materials may be distributed in class.
INTRODUCTION

This is a “new version” of an existing course. It is an “advanced elective” designed for the thoughtful manager who wishes to delve deeper into understanding and managing technological innovation and new product development to create value. We discuss not only managerial practices but also research articles. **Thus, the course lies between an MBA course and a Ph.D. seminar.**

This is an intensive course – it requires you to carefully read one or more articles for each session and to analyze a case. In each session we expect to discuss the assigned readings and cumulatively apply them to the case discussion.

The fields of Technological Innovation and New Product Development have a long and rich history. We will sample a few major topics in this course that can all be broadly classified under one major heading – Technological Competition.

This course is not about any particular technology. Nor is it a course about managing engineers and scientists. It is also not about the Internet and e-business. It is not about goods alone although that is a predominant bias. There are only a few explicit references to services. However, anything we discuss is applicable across the board.

It is expected that you will have a thorough understanding of microeconomics, strategy and the management of organizations. It is highly desirable that you would have completed all core courses in the MBA program.

COURSE STANDARDS

At the outset, it is important to understand that the greatest value from graduate education is seldom realized immediately upon graduation. Such value, which is typically realized over a lifetime, comes not from having a "bag of tricks" but from developing analytical and executive skills. Also, the most valuable ability that you can develop, and sharpen, in graduate school is the ability to think, to read, to write, to speak, and to present your arguments logically.

Accordingly, this is **not a lecture course and you are responsible for a large portion of your own development.** You are required not only to attend classes but also to carefully prepare for each class and contribute actively to class discussion of the assignments for each session. Without your full participation in this learning endeavor, you will not learn.

The emphasis on active class contribution during discussion of assigned readings and cases makes it crucial that preparation for class is of consistently high quality.

EVALUATION

Points earned for each segment of the course will be summed to obtain a total score for the course. Students will be rank-ordered based on this total score to determine their course grade.

Course grades will be determined as follows:

- Homework (Teams of 2) 50%
- Take-Home Final Exam 50%
Homework

In teams of 2, please submit the six very brief homework assignments at the start of class as indicated in bold in the detailed syllabus below. Please answer only the question listed in bold below. Each assignment should be no longer than a ½ page executive summary. In each instance, I will evaluate effort and results. (For our purposes here only, getting it done and submitted on time is much more important than getting it right.) Each homework assignment is based on the readings and case for the respective session. In addition to time for reading and case analysis, budget about 15 minutes on average to complete each homework. No late submissions.

Class Contribution

Effective class contribution involves activities that:
1. Lead to a productive start to the discussion,
2. Affect the discussion positively through the introduction or use of concepts and frameworks
3. Include carefully considered quantitative or qualitative analyses based on data
4. Challenge what appears to be "accepted wisdom",
5. Do not repeat what has already been said.

I will not evaluate your class contributions. However, I strongly encourage you to contribute actively in every class. Since I expect you to be fully prepared for each class, I may call upon you to start or manage the discussion or answer a specific question during the class in any session. If for some reason you are not fully prepared for a particular session, please let me know before class so that I do not embarrass you inadvertently. I urge you to attend all classes, even if you are not adequately prepared. Please inform me if you will be unable to attend class.

Take-Home Final Exam

I view examinations as learning opportunities. You will receive a take-home final exam at the end of the last class session. Your responses will be due back via email by 9 p.m. one week later. (No Late Submissions.)

Note on Grading

Since managerial problems seldom have unique solutions, I will primarily look for compelling logic and reasoning in the analysis, practicality of recommended actions, the "value added" of any exhibits or analyses, and clear and concise oral presentation and writing styles. Since "cut and dried" solutions are not always possible, the grading process will be, in part, subjective but hopefully equitable.

OFFICE HOURS

Office hours will be held by appointment.
CONCLUDING COMMENTS

I will be prepared for class; I expect you to be prepared too. Also, I welcome your comments and constructive criticisms during the course on any aspects of your learning experience. I will be willing to discuss these in class and take appropriate actions that will enhance the "value-added" from this course.

KEY DEADLINES FOR THIS COURSE

<table>
<thead>
<tr>
<th>Every Session:</th>
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CLASS SCHEDULE

Please prepare the assignments listed below for each session using the questions below as a guide. Class discussion will, however, also cover many additional issues.

Session | Topics and Assignments
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**Session 1** | Introduction to Technological Innovation and New Product Development

**Homework #1. Due at the start of class.**

**Read:**  Disruptive Technologies: Catching the Wave.
1. Why were there so many instances of disruptive technologies in the disk-drive industry?
2. Why did firms not learn about the threat of disruptive technologies?
3. Where do you see disruptive technologies threatening successful, established firms today?
4. If you were CEO of the leading firm in one of the industries you identified above, what strategy would you use to counter the threat from a disruptive technology?
5. How would you enter that industry?

**Prepare:**  HP: The Flight of the Kittyhawk.
1. What were the strengths and weaknesses of the way HP structured and supported the Kittyhawk development team? Why?
2. Evaluate the way the team set out to find a market for the Kittyhawk. What did you like? Why? What would you have done differently? Why?
3. What were the root causes for the failure of the Kittyhawk program? How could HP have avoided its fate by addressing those root causes?
4. **What can consumer packaged goods firms such as Kraft Foods, Procter and Gamble and Unilever learn from HP’s Kittyhawk experience?** (Note: Use analyses to develop insights.)

**Session 2** | Technological Standards and Dominance

**Read:**  The Art of Standards Wars.
1. Why do firms go to “war” over standards? What are the “weapons” in standards wars?
2. What are the “strategies” and “tactics” in standards wars?
3. How does a firm know that it is winning or losing a standards war?
4. What course of action is open to the losers in standards wars?

**Prepare:**  Rambus, Inc.: Commercializing the Billion Dollar Idea (A).
1. Why and how did Rambus spur adoption of its RDRAM technology?
2. Why and how does Intel support Rambus?
3. Why and how did competitors react to the Rambus-Intel alliance?
4. Will Rambus succeed in creating the standard for memory chips?
5. Compare and contrast Rambus’ efforts and results with other firms and industries in which standards were attempted or exist today.
Session 3  Value Creation and Capture. Timing.

Homework #2. Due at the start of class.

Read:  Transformative Capacity: Continual Structuring by Intertemporal Technology Transfer.

1. Compare and contrast “Disruptive Technologies” and “Transformative Capacity.”
2. Identify markets that are ahead of technologies today and technologies that are ahead of markets today. Which firms are the key players in those markets and technologies? What would you recommend to one of the firms you identified? (Hint: Use analyses.)

Prepare:  Satellite Radio.

1. Assume you are a hedge fund manager with a well-diversified portfolio, a charter that allows investments in high growth, small capitalization stocks, and that you are evaluated on your fund’s annual performance. Would you invest in either Sirius or XM in mid-January 2004, with their stocks trading at around $3 and $27 respectively? Why or why not?
2. Assess the strategies employed by Sirius and XM. What do you like about their strategies and what would you change? Why?
3. Would the development of interoperable radios (i.e., radios that can receive signals from both Sirius and XM) be advantageous or disadvantageous for either firm? Why?

Session 4  Choosing Projects

Read:  Strategy as a Portfolio of Real Options.

Scientific Management at Merck: An Interview with CFO Judy Lewent.

1. Compare and contrast Real Options with Financial Options.
2. How would you gather the data needed to use Real Options to guide decision making?

Prepare:  Discovering the Future: R&D Strategy at Merck.

1. Compare and contrast Merck’s R&D strategy with that of other firms you know. What role does options analysis play at Merck? What would have been different if Merck did not use options analysis to inform its decision-making?
2. What other criteria might Merck want to consider in deciding which projects to fund and which projects in which to seek a partner?

Session 5  Commercializing Technological Innovation

Homework #3. Due at the start of class.

Read:  Changing the Game of Corporate Research: Learning to Thrive in the Fog of Reality.

1. How does the “Fog of Reality” manifest itself at a firm or business you know? What prevents the firm or business from “clearing the fog?” Why?

Prepare:  Inxight: Incubating a Xerox Technology Spinout.

1. Why has Xerox had trouble capturing value from its innovations? What options should it consider to improve its record on this dimension in the future? (Note: Be analytical.)
2. Why has Xerox created Xerox New Enterprise (XNE) as an incubator? How does the XNE structure work? How is it managed?
3. What are the risks and benefits of Inxight’s business model?
4. How aggressive should Trikha be in funding Inxight? How much money should he ask for 1997?

Session 6 Managing New Product Development.

Read: Technological Choices and the Inevitability of Errors.
1. Why are errors inevitable in making technological choices?
2. Is it advisable to always minimize such errors?
3. What can be done to minimize such errors?

Prepare: IDEO Product Development.
1. Assess the effectiveness and efficiency of IDEO’s processes, organization and management practices for product development.
2. What are IDEO’s options for the Visor project? What would you recommend? Why?

Session 7 Managing New Product Development.

Homework #4. Due at the start of class.

Read: Enlightened Experimentation: The New Imperative for Innovation.
1. What is “enlightened” about the experimentation discussed in the article?
2. Is such experimentation always the best route to take? Why or why not?
3. If not, what alternatives would you consider?

Prepare: Team New Zealand (A).
1. Assess the effectiveness and efficiency of Team New Zealand’s use of simulation in the design process. What measures would you use to make this assessment?
2. In what ways was Team New Zealand’s approach different from that used by other syndicates?
3. Which yacht construction strategy should Team New Zealand follow? Why?
4. How much improvement would you expect from each approach?
5. What can financial services firms such as Citigroup, J. P. Morgan Chase, Merrill Lynch and Fidelity Investments learn from Team New Zealand’s experience? (Note: Use analyses to develop insights.)

Session 8 Managing New Product Development.

Read: Competitive Agility: A Source of Competitive Advantage Based on Speed and Variety.
1. How can speed lead to a competitive advantage?
2. How can variety lead to a competitive advantage?
3. Identify some firms that seem to exhibit competitive agility. Will they be successful? Why?
Prepare: Bank of America (A).
1. Assess the effectiveness and efficiency of Bank of America’s processes, organization and management practices for developing new services.
2. Compare and contrast Bank of America’s approach to other product development approaches. Does it matter whether a good or a service is being developed? Why or why not?
3. How can organizations maximize their learning from experimentation?
4. Should Butler and Brady accept ten additional branches into the experimentation portfolio? Why or why not?

Session 9 Managing New Product Development.
Homework #5. Due at the start of class.

Read: Agile Product Development: Managing Development Flexibility in Uncertain Environments.
1. How does uncertainty affect the need for agility in product development?

1. Assess the effectiveness and efficiency of Dell’s processes, organization and management practices for developing new products prior to 1993.
2. Why has Dell introduced the new 18-month development process? What is the firm trying to change or improve?
3. What are Dell’s options for the new battery? What would you recommend? Why?
4. What can retail services firms such as WalMart, Ahold, Best Buy and Starbucks learn from Dell’s experience? (Note: Use analyses to develop insights.)

Session 10 Managing the Development Pipeline.

Read: Creating Project Plans to Focus Product Development.
1. Why is it advantageous to focus product development? Why not let a 1000 flowers bloom?
2. Compare and contrast a portfolio approach to managing new product development projects with a Discounted Cash Flow approach and a real options approach.

Prepare: Le Petit Chef.
1. Assess Le Petit Chef’s performance. What factors help explain it? What actions would you recommend?
2. What are Brigitte Gagne’s options? What should she do? Why?

Session 11 Evolving Product Development Capability.
Homework #6. Due at the start of class.

Read: Developing Products in Internet Time.
1. Many Internet-based firms have recently been through a debilitating (and often fatal) boom-and-bust cycle. Some observers believe that there is nothing to be learned from the experiences of such firms. What is your view? Why?
Prepare: Living on Internet Time: Product Development at Netscape, Microsoft, Yahoo!, and NetDynamics.

1. Compare and contrast the four approaches to product development. What drives any similarities and differences among them?

2. What can firms offering professional services such as management consulting, accounting, healthcare, advertising, real-estate management, education, and legal advice learn from the four approaches to product development? (Note: Use analyses to develop insights.)

Session 12 In-semester activity.

TO BE DETERMINED