

The Wharton School, University of Pennsylvania

MGMT 731 –Technology Strategy

Spring 2009 (Q4)

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Office hours: by appointment

1. Description: This quarter-length course presents tools necessary for managing businesses involved in or affected by technological innovation. It does so by developing and applying conceptual models concerned with creating, capturing, and delivering value. The course is designed to meet the needs of future managers, entrepreneurs, consultants, or bankers who must understand the interactive role of technology and organization in deriving competitive advantage. The first half of the course focuses on analytic frameworks for managing the innovation process. This segment examines the patterns and sources of technological change and the mechanisms for capturing the economic benefits from innovation. The second half of the course studies the strategic and organizational challenges involved in managing technological innovation. Case studies throughout the course will offer opportunities to apply the frameworks.

2. Requirements & Procedures: Active class participation, and in lieu of a final examination, a final paper *due on Tuesday, April 28 at noon*.

I have found that internet use distracts from the learning experience in class, and so ask that you refrain from using your laptop computers and smartphones when class is in session. To ensure that the class is highly interactive, *I ask that you bring your name card to each and every class meeting*. I will actively use the class webcafe website to post notes and manage the class.

2.1 Individual responses to the daily poll: Before almost each class session (exceptions are noted in this syllabus), there will be a survey question posed on webcafe. Everyone will be individually responsible for responding to the poll by 5AM the day of class. Answering the question will not take much time beyond your normal preparation for class. If you do not respond to the poll, I will assume you have not prepared for class and will not call on you. Your participation in the online questionnaire will count towards your class participation grade.

2.2 Term paper: The paper will trace the past and likely future development of a technology-based product or firm (a new venture or an existing firm) of the team's choosing. I do not wish the paper to be primarily a history of the product or firm, though there will have to be some such background discussion. A significant part of the paper should be devoted to using class lessons to assess the key decisions and challenges (including those anticipated in the future) confronting the managerial team. Part of the paper should also be devoted to your recommendations to overcome the challenges identified, together with an assessment of how the firm could create and/or capture additional value for stakeholders.

The team size will be 4 or 5 people, and the final paper will be 20 or 25 pages in length depending on team size. Please use whatever formatting you wish; you should deliver a professional end product. Please make use of the “discussion” section of webcafe to facilitate team formation. Teams can be formed across sections.

There are two important dates for the term paper:

- By March 26 (class 4) at 5pm, please upload to webcafe a one to three page statement of the topic of your term project including a rough outline of your paper. I will regard this submission as a binding statement of your term project. Please make sure that names of all team members are on the submission.
- The final paper is due on Tuesday, April 28 at noon. The final paper should be submitted electronically on webcafe.

While you are probably aware of the conventions of properly citing material and ideas, I believe a short note on the subject is worthwhile. Material reproduced verbatim should be enclosed in quotation marks, with proper attribution made to the source. Ideas and concepts even if not quoted verbatim should be attributed to the author/source, also via proper citation.

3. Grading: class participation (40%), statement of final paper topic (5%), and the final paper (55%).

4. Enrollment: Wharton School MBAs.

5. Materials: Required course packet available through Reprographics (basement of SHDH).

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I. INTRODUCTION TO TECHNOLOGY STRATEGY

Session 1: What is technology strategy? [March 17]

Read: G. Moore (1999), Crossing the Chasm, Harper Business Press. Chapters 1 and 2.

Study questions: According to Moore, what are the key challenges of managing technological innovation? What are other unique factors in innovation management and strategy?

II. CREATING VALUE: PATTERNS OF CHANGE IN TECHNOLOGIES AND MARKETS

Session 2: Evolution of Technology Markets (1) [March 19]

Read: R. Foster (1996), "The S-Curve: A New Forecasting Tool," Innovation: The Attacker's Advantage, Summit Books, Simon and Schuster: NY, Chapter 4, pp. 88-111.

J. Utterback (1994), "Dominant Designs and the Survival of Firms" Chapter 2 in Mastering the Dynamics of Innovation, Harvard Business School Press, pp. 23-55.

Study question: (1) Make a list of factors you believe are most important in determining the rate at which technology improves and diffuses into the market. How does diffusion depend on the continued evolution of the technology? (2) What is a dominant design? How is it established? In what industries do you think this model is most appropriate?

Session 3: Evolution of Technology Markets (2) [March 24]

Read: J. Utterback (1994), "Innovation and Industrial Evolution," Chapter 4 in Mastering the Dynamics of Innovation, Harvard Business School Press, pp. 79-102.

Case: "Sony Corporation: Car Navigation Systems," HBS 9-597-032.

Study questions: What are the obstacles to- and potential drivers-of car navigator adoption in untapped markets?

For next time: a one to three page outline/summary of the idea for your final paper is due at 5pm.

III. CAPTURING VALUE: PROFITING FROM INNOVATION

Session 4: Earning Value from Innovation (1) [March 26]

Read: D. Teece (2000), "Market Entry Strategies for Innovators: Avoiding Pyrrhic Victories," in Managing Intellectual Capital, Oxford University Press, pp. 91-113.

“A Market for Ideas: A Survey of Intellectual Property Protection,” October 22, 2005, *The Economist*. **Read pp. 3-12, skim the rest.**

Study question: What are the ways in which innovators can capture the value they create?

Session 5: Earning Value from Innovation (2) [March 31]

Read: J. Gans and S. Stern, “The Product Market and the Market for Ideas: Commercialization Strategies for Technology Entrepreneurs,” *Research Policy*, 2003.

Case: “Abgenix and the XenoMouse,” HBS case 9-501-061.

Study questions: (1) What are the key determinants of whether firms will be able to profit from innovation in different economic environments? Would you add any additional factors? (2) What are the pros and cons of the different actions available to the managers at Abgenix? Which action would you recommend to Abgenix? Why?

Session 6: Optional Class – work on completing your final paper [April 2]

While regular class is cancelled, I will bring coffee to the classroom for anyone who would like to come and chat and speculate about any area of technology and organization. I will come with a few current event topics to get us started; other details TBD.

Session 7: Strategy in Standards-Oriented Technology Markets [April 7]

Read: C. Shapiro and H. Varian (1999), “The Art of Standards Wars,” *California Management Review*, Vol. 41, pp. 8-32.

Optional: A. McGahan, L. Vadasz, and D. Yoffie (1997), “Creating Value and Setting Standards: The Lessons of Consumer Electronics for Personal Digital Assistants,” in Competing in the Age of Digital Convergence, Harvard Business School Press. Focus on pages 239-254.

Study question: What are the managerial dilemmas posed by technology standards? How would you resolve them?

IV. DELIVERING VALUE: ORGANIZATIONAL COMPETENCE

Session 8: How and When do Established Firms Fail to Capitalize? [April 9]

Read: C. Christensen (1997), “How Can Great Firms Fail? Insights from the Hard Disk Industry,” in The Innovator’s Dilemma, Harvard Business School Press.

R. Henderson and K. Clark (1990), “Architectural Innovation: The Reconfiguration of Existing Product Technologies and the Failure of Established Firms,” *Administrative Science Quarterly*. **Read pages 9-19 only.**

Study question: What do you consider to be the key management challenges to maintaining technological and market leadership? What solutions would you suggest to overcome them?

Session 9: Preparing and Responding to Disruptive Technology [April 14]

Case: R.R. Donnelley and Sons: The Digital Division, HBS 9-396-154.

Study questions: Should Donnelley have entered the digital business in the first place? Why or why not? Given that they did enter, was it a good idea to set up a separate division? What should the firm’s strategy be going forward?

Session 10: Organizing for Innovation (1) [April 16]

Read: W. Cohen and D. Levinthal (1990), “Absorptive Capacity: A New Perspective on Learning and Innovation,” *Administrative Science Quarterly*, Vol. 35. **Read pages 128-138 only.**

H. Chesbrough and D. Teece (1996). “Organizing for Innovation: When Is Virtual Virtuous?” *Harvard Business Review*, August 2002.

Study questions: How much “basic” vs. “applied” research should a firm invest in? How can employees best be motivated for innovative productivity? What are the key determinants of how a firm should access external knowledge and innovation?

Session 11: Organizing for Innovation (2) [April 21]

Read: J. Surowiecki (2004), introduction to *The Wisdom of Crowds*, Anchor Books, pp. 3-22.

Case: Cambrian House, HBS 9-608-016.

Study question: Under what circumstances is crowdsourcing likely to yield superior innovative outcomes for organizations?

Session 12: Putting Development Strategy to Work and Course Wrap-up [April 23]

Case: Kodak, HBS Case 9-703-503.

Study questions: (1) Review your notes and thoughts. What are the most important management lessons from this course? (2) What should Kodak’s corporate strategy be in the face of the emerging digital revolution?

The final paper is due on Tuesday, April 28 at noon. Please upload your paper electronically to webcafe. Note: no late papers will be accepted!