



## MANAGEMENT 731: TECHNOLOGY STRATEGY

Spring 2011 (Quarter 3)

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Office hours: by appointment

### COURSE DESCRIPTION

The course is designed for students interested in analyzing and developing firm strategies in industries where technological innovations play an important role in creating and sustaining competitive advantage. It provides concepts and frameworks to help understand the interaction among firm strategies, technologies and markets. Students act in the roles of key decision-makers or their advisors and solve problems related to the development or maintenance of the competitive advantage of the firm in a given market. The first part of the course focuses on technology and industry dynamics. Next, we examine the strategic challenges and opportunities that firms face in competing with their innovations. Finally, we expand our analysis from firms to ecosystems and understand the key drivers of value creation and value capture in such interdependent value chains.

The course uses a combination of cases and conceptual readings. The cases are drawn primarily from technology-based settings. Note, however, that the course discussions are mainly based on strategic (not technical) issues. Hence, a technical background is not required for fruitful participation.

### EVALUATION

#### Individual

Class participation (30%)

#### Team

Application project

- Project presentation (14%)
- Final paper (40%)

Feedback on another team's application project (16%)

### INDIVIDUAL RESPONSES TO THE DAILY POLL

For class sessions 2-10, there will be a survey poll posted on webCafé in the "Assessments" section. Everyone will be individually responsible for responding to the poll by 6AM the day of class. Answering the poll will not take much time beyond your normal preparation for the class. If you do not respond to the poll, I will assume that 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.

### APPLICATION PROJECT

The major assignment for the course is a team project that applies the concepts and frameworks learnt in the course to an episode of technology strategy in an industry. The project should be worked on in a team of four or five (preferred) students (team sign-up by 1/18). In keeping with the spirit of the class, the project will examine how a specific firm chose to create and capture value from its technological innovation. I am open to studying both successes and failures. The more specific the innovation, the more narrow the definition of the market, the better. For example, it is better to focus on digital imaging than printing technologies; web browsers than internet application software; pacemakers than medical devices. Past projects have included Toyota Prius, Nintendo Wii, Sony 3D TV, eBay auction platform, Palm PDA, SunPower solar panels, Microsoft mobile OS, PayPal online payment and Skype's VOIP application.

The one page proposal (due on 1/27@7pm) is meant to define the boundaries within which your team would work on the application project. The proposal will not be graded. I will meet with your group and provide feedback/suggestions so as to align our expectations going forward. The proposal should include the topic and outline the strategic/technological issues that you plan to consider. It will also be helpful if you can mention how you plan to collect data for the project (e.g., archival sources/interviews).

The project presentations (classes 12 and 13) are meant to showcase your analysis to your classmates and to receive feedback that can be incorporated into the final paper. The presentation should last for about ten minutes followed by five minutes for Q&A. It should provide a brief industry overview (about two minutes) but mostly focus on your analysis, recommendations, and lessons learnt. All presentation should be uploaded on webCafé by 2/21 (midnight).

The final paper (due on 3/6@7pm) should be about 25 pages in length. The paper will be evaluated on four dimensions: First, the insight offered by the analysis – does it go beyond describing what happened to shed light on the fundamental causes. Second, the quality of the analysis and how well it integrates the concepts developed in the course. Third, how relevant, useful, and well supported are the lessons and recommendations presented. Fourth, the readability of the paper and readers' access to the ideas presented.

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.

#### **FEEDBACK ON ANOTHER TEAM'S APPLICATION PROJECT**

Each team will be assigned to provide feedback on another team's application project. The feedback should be about two pages in length and will be due on 2/27@7pm after the teams have presented their analysis in the class. The feedback should evaluate the quality of the analysis and provide suggestions for improving the final paper (rather than the presentation style/delivery). I will share the feedback so the teams will have a chance to incorporate them into the final paper (be courteous in your evaluation!).

## COURSE OUTLINE\*

### **Class 1: Introduction; What is Technology Strategy? (Thu 01/13)**

Readings: (1) Taylor III, A. (2010), "Here comes the electric Nissan Leaf," *Fortune*, 161(3);  
(2) Weingarten, T. (2010), "The new hot wheels," *Newsweek*, 156(24).

### **Class 2: Technology and industry dynamics (Tue 01/18)**

Readings: (1) McGahan, Anita (2004), "How Industries Change." *Harvard Business Review*. 82(10): 86-94;  
(2) Utterback, James. (1994), "Dominant Designs and the Survival of Firms" and "Innovation and Industrial Evolution," Chapters 2 and 4 in *Mastering the Dynamics of Innovation*.

*Complete Team Sign-Up by 7pm on 01/18 Via WebCafé and E-Mail*

### **Class 3: Technology positioning in emerging markets (Thu 01/20)**

Case: E Ink in 2005 (HBS 9-705-506)

Reading: (1) Foster, R. (1986), "The S-curve: A New Forecasting Tool," Chapter 4 in *Innovation, The Attacker's Advantage*. (2) Moore, G. (1999), "High-tech Market Illusion" and "High-Tech Marketing Enlightenment," Chapters 1 and 2 in *Crossing the Chasm*.

### **Class 4: Technology positioning in existing markets (Tue 01/25)**

Case: Hewlett-Packard: The Flight of the Kittyhawk (HBS 9-606-088)

Reading: Christensen, C. (1997), "Value Networks and the Impetus to Innovate," Chapter 2 in *Innovator's Dilemma*.

### **Class 5: Technology substitution (Thu 01/27)**

Case: Kodak and the Digital Revolution (HBS 9-705-448)

Reading: O'Reilly III, Charles A. and Tushman, Michael L. (2004), "The Ambidextrous Organization," *Harvard Business Review*, 82(4): 74-81.

*Application project proposal due by 7pm on 01/27 Via WebCafé*

### **Class 6: Network externalities and standards (Tue 02/01)**

Case: (1) DVD War (HBS 9-706-504), (2) Kenji Hall, "DVD Format Wars: Toshiba Surrenders," *BusinessWeek*, February 19, 2008.

Reading: Shapiro, C. and Varian, H. (1999), "Networks and Positive Feedback," Chapter 7 in *Information Rules: A Strategic Guide to the Network Economy*.

### **Class 7: Complementary assets (Thu 02/03)**

Case: Abgenix and the XenoMouse (HBS 9-501-061)

Reading: Teece, D. J. (1986), "Profiting from Technological Innovation: Implications for Integration, Collaboration, Licensing and Public Policy," *Research Policy*, 15(6): 285-305.

### **Class 8: Technology licensing and creating markets for IP (Tue 02/08)**

Case: Carrot or Stick? Getting Paid for Innovation at Tessera Technologies (HBS 9-610-085)

Reading: Pisano, Gary P. and Teece, David J. (2007), "How to Capture Value from Innovation: Shaping Intellectual Property and Industry Architecture," *California Management Review*, 50(1): 278-296

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\* Please note that slides will be posted after each class in the webCafé room set up for this course.

**Class 9: Business ecosystems (Thu 02/10)**

Case: HTC Corp in 2009 (HBS 9-709-466)

Reading: (1) Moore, J.F. (1993), "Predators and Prey: A New Ecology of Competition," *Harvard Business Review*, 71(3): 75 - 86; (2) Iansiti M. and Levien R. (2004), "Strategy as Ecology," *Harvard Business Review*, 82(3): 68-78.

**Class 10: Technology evolution and ecosystems (Tue 02/15)**

Case: previous cases (Electric Car; E Ink; Hewlett Packard)

Reading: Adner, R. 2006, "Match your innovation strategy to your innovation ecosystem," *Harvard Business Review*, 84(4) 98-107.

Supplementary Readings: (1) Adner, R. and Kapoor (2010), "Value Creation in Innovation Ecosystems: How the Structure of Technological Interdependence Affects Firm Performance in New Technology Generations," *Strategic Management Journal*, 31(3): 306-333; (2) Adner, R. and Kapoor, R. (2010), "Innovation Ecosystems and the Pace of Substitution: Re-examining Technology S-curves," Working paper.

**Class 11: No Class – work on completing your application project (Thu 02/17)**

*Copy of presentation due by midnight on 02/21 Via WebCafé*

**Class 12: Project Presentations (Tue 02/22)**

**Class 13: Project Presentations (Thu 02/24)**

*Feedback on another team's application project due by 7pm on 02/27 Via WebCafé*

**Class 14: Wrap-up (Tue 03/01)**

*Final paper due by 7pm on 03/06 Via WebCafé*