15.910 Innovation Strategy
Spring 2011 – E51-395
Section A: MWF 08:30am-10:00am
Section B: MWF 10:00am-11:30am

Teaching Assistants:
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COURSE PURPOSE
This course provides a strategy framework—drawing upon the economics of technical change—for high-technology businesses. The emphasis is on the development and application of conceptual models clarifying the interactions between competition, patterns of technological and market change, and the structure and development of internal firm capabilities. The aim of this course is to provide a solid foundation for students interested in managing innovation in high-technology industries. The course teaches you (a) how to ask the right questions about high-technology markets and organizations, (b) analyze the structure and develop strategies for these markets, and (c) link analysis and strategy development to technology and innovation management. Throughout, key conceptual frameworks are linked to applications in a variety of industry and case settings.

The course has one formal prerequisite (in addition to enthusiasm): Competitive Strategy (15.900). If 15.910 is your first strategy course, please contact me prior to the second class. The course is designed to be particularly appropriate for those who anticipate taking positions as:

- a manager in a technology-intensive firm
- an analyst or investor in technology markets
- a management consultant whose practice focuses on technology-driven firms/industry segments

You should be prepared for every class, including the introductory lecture. The class is highly interactive. To prepare readings, summarize the problem addressed by the article, outline its core points and recommendations, and assess the strengths & weaknesses of the reading’s central argument. For cases, identify the key problem facing the protagonists, evaluate alternative approaches to these problems, and think about the course of action you would recommend and why. Group works (and study groups) are critical; effective group cooperation is crucial to a valuable class experience.

Assigned case readings are available from CopyTech. As well, Stellar will be used extensively as a course website. The site is a critical complement to the lectures. Before each class, Stellar will include links to points of interest (e.g., company websites), as well as supplementary reading materials and reading guides for several of the cases included in the course. I will also post the slides within 48 hours after each lecture. Finally, Stellar will include key course information such as the syllabus, assignments, due dates, and updates. You should check the site on a regular basis.
ATTENDANCE & CLASS PREPARATION
This is not an easy course, since it provides an in-depth introduction to an extraordinarily complex subject. Cutting class will affect your grade and more importantly your own and your classmates’ experience in the class. If you do miss a session, it will be your responsibility to find out what materials were covered, what assignments were made, and what handouts you missed. If you miss more than one session without warning me in advance it will severely impact your class participation grade.

You should be prepared for every class. I will open every class by asking someone to briefly summarize one of the reading, or to briefly summarize the case. In the case of a reading, you should be able to briefly outline the problem that the article addresses, describe the core points of the readings, and offer your analysis of the strengths and weaknesses of the reading’s central argument. In the case of a case, you should be able to identify the key issues, problems and opportunities facing the central protagonists, to articulate and evaluate alternative approaches to the problems, and to describe the course of action that you recommend and the reasons for your recommendations.

Note that I provide many supplemental readings that can be read at a later date. They are made available so that you can deepen the understanding of the corresponding topic at a time of your choosing.

REQUIREMENTS, GRADING, & DUE DATES
Active Class & Group Participation (30%)
   a. Weekly Class Environment (15%). For each class, each student is expected to prepare readings and case studies, listen closely to class discussion, and share their ideas.
   b. Class Participation Leadership Opportunity (10%). Each student will take responsibility for “leading” the discussion for one class during the quarter. This provides an opportunity for each student to “stand out” and get specific feedback on participation during the quarter. A sign-up sheet and further details will be distributed in Class 1.
   c. 360˚ Group Evaluation (5%+). Each group member will be evaluated by all group members at the end of the quarter. Substantial evidence that group work has been unevenly completed will count against the class participation grade.

Group Homework Assignments (30%)
Three group homework assignments will be given, due April 8, April 11, and April 25. Each group should be composed of 3 or 4 individuals. Each assignment will be designed to further understanding of the management and strategy issues which arise in innovative industries. Grading will be on a √/√+/√– basis.

Integrative Case Analysis (40%)
While group discussion is encouraged for all assignments, this last assignment, due May 4, must be written up individually. This case analysis will require you to develop an overall strategy recommendation for a high-technology company. While the group assignments will focus on individual frameworks and tools in isolation, the goal of this final assignment is to develop your ability to offer an integrated analysis and implementation plan for innovation management.
# Course Outline

## Introduction: What is Innovation Strategy?  
March 28

## I. Creating Value: Patterns of Change in Technologies & Markets

- **The Nature and Evolution of Technology Markets**  
  March 30
- **Case: The Diffusion of Agriculture Biotechnology**  
  April 01
- **The Technology S-Curve**  
  April 04
- **The Dominant Design Framework**  
  April 06

## II. Capturing Value: Profiting from Innovation

- **Profiting from Technological Innovation**  
  April 08
- **Value from Intellectual Property: Patents & Beyond**  
  April 11
- **The Gale of Creative Destruction**  
  April 13
- **Case: Flash of Genius**  
  April 15
- **Managing Competence-Destroying Innovation**  
  April 20
- **Case: The Crisis at *Encyclopædia Britannica***  
  April 22
- **Acquiring and Leveraging External Innovators**  
  April 25
- **Case: GSK’s Acquisition of Sirtris**  
  April 27

## III. Managing Technology Standards & Platforms

- **Strategy in Standards-Oriented Technology Markets**  
  April 29
- **Case: Qualcomm, Inc. in 2009**  
  May 02
- **The Economics of Multi-Sided Platforms**  
  May 04

## IV. Managing in the Era of Open Innovation

- **In-House vs. External R&D**  
  May 06
- **The Economics of Open Source Software Development**  
  May 09

## Wrap-up  
May 11
Class 1  

**What is Innovation Strategy?**

March 28

Corning Inc.: The Growth and Strategy Council [Sloan #08-056]


**Supplementary Reading**


**Questions for Discussion**

What is an innovation strategy? What, in your view, should it include? Can you write down the innovation strategy of your last employer?

What are the key strategic challenges in using technological innovation as the basis for competitive advantage? What firms have been able to secure extraordinary returns from technological innovation? Why do you think these firms have been able to prosper? Rosenberg highlights the importance of uncertainty in the process of technological change. What managerial challenges (and opportunities) arise in the face of inherent uncertainty?

Class 2  

**The Nature and Evolution of Technology Markets**

March 30


**Supplementary Reading**


**Questions for Discussion**

What is the relationship between science and technology? How does science contribute to the development and diffusion of new technologies (and when does technology itself spur new scientific discoveries)? What are some different types of innovation, and how does the nature of innovation change as a technology matures?

Moore claims that the key challenge in managing innovation is the ability to understand how strategy must respond to the staging and timing of technology diffusion. Make a list of factors you believe are most important in determining the diffusion rate. What determines the relative importance of different factors? How should a firm change their tactics and their product development activities as technology diffuses?

Class 3  

**Case: The Diffusion of Agriculture Biotechnology**

April 1


In-Class Video Excerpt: *Harvest of Fear*, PBS Frontline [http://www.pbs.org/wgbh/harvest/]

**Questions for Discussion**

The rate of adoption of different agricultural biotechnology products varies widely, and there are significant differences in adoption rates by crop type, genetic traits, and region. What are the key elements of an effective diffusion strategy for a new agricultural biotechnology product? Is there a “Chasm”? How did Monsanto adjust their diffusion strategy as they learned more about this emerging market and technology?


Questions for Discussion
Foster claims that the key challenge in managing innovation is the ability to take advantage of improvements over time in technology performance, and making the transition between different technology generations. Make a list of those factors which you believe are most important in determining improvements in technological performance. What are the key challenges in taking advantage of the process of changing technological performance over time?

General Motors introduced the EV-1, the first modern production electric vehicle in 1996, yet has been unable to build on this early advantage as the market for alternative energy vehicles has evolved. Why was GM unable to immediately exploit the rise in demand for “green” cars over the last few years? What are the key lessons that GM’s leadership should draw from the EV-1 experience as GM prepares to “go green”?


Supplementary Readings


Questions for Discussion
These readings develop a model of the co-evolution of technological innovation, competition, and organizations and relate them to the classic “static” frameworks from 15.900. What are the managerial implications of integrating static and dynamic strategic perspectives?


Questions for Discussion
How does the relative importance of appropriability and complementary assets change over the life cycle of an industry? What is the relationship between Teece’s concept of “complementary assets” and “barriers to entry” as defined by Porter?

HOMEWORK #1 DUE!
Class 7  **Value from Intellectual Property: Patents & Beyond**  
Intellectual Ventures [HBS #9-710-423]  
April 11


**Supplementary Readings**


**Questions for Discussion**

Intellectual property laws are intended to enable inventors to protect the knowledge embodied in their products. How well do they do the job? What avenues are available for protecting one’s ideas? How do you choose among intellectual property instruments to protect a new invention? How does the probabilistic nature of the patent system impact effective strategic management of intellectual property?

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Class 8  **The Gale of Creative Destruction**  
April 13


**Supplementary Reading**


**Questions for Discussion**

What do you think are the drivers of “Creative Destruction”? What do you consider to be the key management challenges to maintain technological and market leadership? Why do some firms find it so difficult to adapt in the face of new technology?

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Class 9  **“Flash of Genius” Negotiation Exercise**  
April 15


**Homework #2 Due!**
Class 10  **Managing Competence-Destroying Innovation**  
April 20


**Questions for Discussion**
Why do managers find it so difficult to anticipate and respond to disruptive innovation? How important are organizational barriers? How important are customer relationships? What are the crucial elements of an effective strategy for managing the Attacker’s Advantage? How important are organizational barriers for implementation?

Class 11  **Case: The Crisis at Encyclopædia Britannica**  
[Kellogg #5-306-504]  
April 22

**Questions for Discussion**
What initiatives did the management at Encyclopædia Britannica undertake in anticipation of an electronic future? Which part of the organization most resisted changing their operations – were these the most successful or least successful parts of the organization? Why was technical success insufficient to achieve business success in all the examples in the cases? Would you have managed the transition to a digital encyclopaedia differently?

Class 12  **Acquiring and Leveraging External Innovators**  
April 25


**Questions for Discussion**
Start-up innovators and established firms can benefit from commercialization through the “market for ideas.” However, effective acquisition of start-up technology has eluded many established firms. What are the crucial implementation issues associated with technology acquisitions? What is the difference between a “people” versus a “product” acquisition?

**HOMEWORK #3 DUE!**
Questions for Discussion
Slouoi and Andrew Witty, GSK’s CEO, must sell the acquisition of Sirtri to two key constituencies: the GSK board of directors, and Westphal and the senior team at Sirtris. How would you make these pitches (and please be prepared to do so)?

If you are Westphal, how do you feel when you get the call from Slouoi? What terms are you most inclined to negotiate?

Put yourself in Slouoi’s position. How should you manage the integration of Sirtris? Now think about this same question from the perspectives of Westphal and Dipp.

Class 14 Strategy in Standards-Oriented Technology Markets April 29

Supplementary Reading

Questions for Discussion
The importance of standards and networks changes the nature of competition in many technologically dynamic sectors. What are the key managerial dilemmas posed by standards? Can you think of one company that you think has taken advantage of standard-setting? How about a company that has yielded competitive advantage by mismanaging standards?

Class 15 Case: Qualcomm, Inc. in 2009 [HBS #9-710-433] May 2
Questions for Discussion
Why has Qualcomm been so much more successful than many other would-be standard leaders in appropriating value from its technology?

Evalute the company’s strategy to date. What are the most significant threats to its competitive position? What would you recommend to Irwin and Paul Jacobs?
Class 16  Economics of Multi-Sided Platforms  May 4
Akamai Technologies [HBS #9-804-158]


Supplementary Reading

INTEGRATIVE CASE ANALYSIS DUE!

Questions for Discussion
What explains Akamai’s early success with Free flow? Why did Akamai charge content providers and subsidize ISPs? Is the CDN business a winner-take-all category? Why did Akamai’s proprietary CDN prevail over alliances that pooled servers, such as Content Bridge? Did Akamai have the right strategy for financing accelerated growth?

Class 17  In-House vs. External R&D  May 6


Supplementary Readings

Questions for Discussion
When does an “open” approach to innovation make sense, and when might a more proprietary approach be in a firm’s interest? What are the benefits and challenges of participating in an innovation network, as in biotechnology?

Class 18  The Economics of Open Source Software Development  May 9


Supplementary Reading

Questions for Discussion
What is the promise of the “open source” movement in software and other sectors? How should KMS Corp. deal with the challenge of open source competitors?
Wrap-up


Review your notes and your thoughts. What are the most important management lessons which you will bring from the course? How is information technology (and the Internet in particular) changing the management of technology itself?