

Course Overview

This course examines the technical and managerial challenges presented by emerging and evolving technologies. Particular consideration is given to the forces affecting the nature and rate of technological innovation and the managerial options available to both established and entrepreneurial organizations. In doing so, we explore both internal and external sources of innovation as well as the appropriate strategies and processes for capitalizing on them.

Time: Tuesday/Thursday 1:30-3:00 p.m.

Place: SHDH 107

Instructor: Dr. Saikat Chaudhuri
Assistant Professor of Management
saikatc@wharton.upenn.edu; 215-898-6387

Course Assistants: Phillip Baker, Tyler Citek, Karan Dhruve, Parth Doshi, Nora Turek

webCafé: <https://webcafe.wharton.upenn.edu/eRoom/mgmt/237-sp12-1>

Course Requirements

The course will be taught in seminar fashion with substantial class discussion. Thorough preparation and active class participation and attendance are essential. Assigned and supplementary readings will be augmented by cases and occasional guest lectures. Students will prepare a variety of written assignments, including case analyses and two research papers dealing with selected technologies, firms and industries. Research topics will be selected by students with instructor approval. The final course grade will be based on: (a) case analyses, annotated bibliographies, and the course concepts and perspectives assignment (30%); (b) research papers and presentations (45%); and (c) class participation (25%).

Course Materials

Text (T): Strategic Management of Technological Innovation, Third Edition, Melissa A. Schilling, McGraw-Hill Irwin, © 2010.

Bulk Pack (BP): Assigned articles and cases from Wharton Reprographics

WebCafé (WC): Supplementary assigned articles on webCafé

Lippincott Websites: <http://gethelp.library.upenn.edu/guides/business/mgmt237.html> (general resources)
<http://gethelp.library.upenn.edu/PORT/> (research guidelines)

RULES OF COURSE CONDUCT

I will be expecting a lot from each of you in this course, just as you should be expecting a lot from me. Together we can make this a very positive and valuable excursion into the intersection of Management and Technology. Toward that end, please review and observe the following:

1. Be on time and well prepared.
2. Participate actively and constructively in class discussions – whether offering observations, answering questions or challenging other's positions (including mine!). You may find this to be a challenge in a large class and this will be more difficult for some than for others.
3. Bring your name card to every session to help ensure that the class is highly interactive.
4. Do not open your laptops when class is in session – I have found that computer use distracts from the learning experience and active interaction during class.
5. Pay careful attention to what is going on in each class and be alert to opportunities to participate. This includes not only what is being presented from the front, but also what your classmates are contributing.
6. Eating food is absolutely forbidden once each class session begins. I realize that this may impose some hardship on those of you whose schedules preclude a lunch period. The only exception is if you bring enough for every one! Water and other drinks are permitted.
7. In the rare event that you are forced to miss a class, be sure to alert me IN ADVANCE by email with an explanation. It will be your responsibility to obtain class notes and/or handouts from your classmates and/or the M&T office. Only in exceptional circumstances will make-ups be arranged for missed unannounced quizzes.
8. Written assignments are due on the date indicated unless prior approval has been granted. Late assignments will receive a minimum of a one grade reduction.
9. All written assignments in this course are to be your individual work – unless explicitly indicated otherwise. And, while most of you are aware of the accepted conventions for citing material and ideas, this has occasionally posed problems in the past. Anything reproduced verbatim should be indicated by quotation marks with the source appropriately cited. Anything drawn from others but not quoted verbatim, such as ideas or concepts, must also be appropriately cited. See <http://gethelp.library.upenn.edu/PORT/> and/or consult the Lippincott Library staff for further guidance if needed.

Course Syllabus**I. UNDERSTANDING TECHNOLOGICAL INNOVATION**

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|----|---------|---|--|
| 1. | TH 1/12 | THE NATURE OF TECHNOLOGICAL INNOVATION
Introduction (<i>Skim</i>)
Sources of Innovation (<i>Skim</i>)
Innovation in Industry (<i>Skim</i>)
Out of the Dusty Labs (<i>Skim</i>)
This Way to the Future (<i>Skim</i>)
The Unexpected Science to Come (<i>Skim</i>)
10 Emerging Technologies 2011 (<i>Skim</i>)
Century of the Sciences (<i>Skim</i>) | T: 1
T: 2
BP: 1
BP: 2
WC: 1
WC: 2
WC: 3
WC: 4 |
| 2. | TU 1/17 | THE STRATEGIC IMPACT OF TECHNOLOGICAL CHANGE
Types and Patterns of Innovation
Why Good Companies Go Bad (<i>Skim</i>)
Timing of Entry
Technological Innovation in the Photographic Industry (<i>Skim</i>) | T: 3
WC: 5
T: 5
BP: 3 |
| 3. | TH 1/19 | INNOVATION PATTERNS AND EMERGING VS. ESTABLISHED TECHNOLOGIES
Patterns of Industrial Innovation
The Dynamics of Technology and Strategy (<i>Skim</i>)
Timex Corporation (A) and (B) | BP: 4
BP: 5
<u>BP: 6</u> |
| 4. | TU 1/24 | TECHNOLOGY POLICY
<u>Guest Resource:</u> Dr. Graham Mitchell, formerly U.S. Assistant Secretary of
Commerce for Technology Policy, U.S. Department of Commerce
Office of Technology Policy Report "The Global Context for U.S. Technology Policy"
2012 Global R&D Funding Forecast Report
The Fading Lustre of Clusters | WC: 7
WC: 8
WC: 9 |
| 5. | TH 1/26 | TECHNOLOGICAL INNOVATION AND STRATEGIC MANAGEMENT
Defining the Organization's Strategic Direction
Technology Leadership Can Pay Off
Technology and Competitive Advantage: The Role of General Management
Managing Technology as a Strategic Asset | <u>RP #1 Proposal</u>
T: 6
BP: 7
BP: 8
WC: 6 |
| 6. | TU 1/31 | PERSPECTIVES ON EMERGING TECHNOLOGY | <u>AB #1</u> |

II. MANAGING TECHNOLOGICAL INNOVATION AND NEW PRODUCT DEVELOPMENT

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| 7. | TH 2/02 | TECHNOLOGY AND COMPETITIVE ADVANTAGE
Standards Battles and Design Dominance (<i>Skim</i>)
The Art of Standards Wars
Battle for Cloud Productivity: Office 365 vs. Google Apps | T: 4
WC: 10
WC: 11 |
| 8. | TU 2/07 | GLOBAL TECHNOLOGY AND INNOVATION
Strategies for Global R&D
Technology Map of the World
Toyota and Sony: R&D Alone Is Not Enough
India and China Wise Up to Innovation
Revving Up
Growing Through Innovation | BP: 9
BP: 10
BP: 11
BP: 12
WC: 12
WC: 13 |
| 9. | TH 2/09 | MANAGING TECHNOLOGY STRATEGIES AND THE INNOVATION PROCESS
Choosing Innovation Projects
Managing Real Options (<i>Skim</i>)
Managing the New Product Development Process
Developing Products on Internet Time
Silicon Valley Specialists | T: 7
BP: 13
T: 11
BP: 14
BP: 15 |
| 10. | TU 2/14 | LESSONS FROM INNOVATIVE FIRMS
Masters of Innovation: How 3M Keeps Its New Products Coming
GE Sees the Light
Built for Innovation
Putting the "I" into HP
3M's Innovation Crisis
The World's Most Innovative Companies
Lessons from Apple
Radical Collaboration: Lessons from IBM's Innovation Factory | BP: 16
BP: 17
BP: 18
BP: 19
WC: 14
WC: 15
WC: 16
WC: 17 |
| 11. | TH 2/16 | TECHNOLOGICAL INNOVATION, ENTREPRENEURSHIP, AND ORGANIZATION
Organizing for Innovation
Entrepreneurship (<i>Skim</i>)
Hermes Systems | T: 10
BP: 20
<u>BP: 21</u> |
| 12. | TU 2/21 | WINDOW ON TECHNOLOGICAL INNOVATION
<u>Guest Resource:</u> Dr. Terry Fadem, Director, Corporate Alliances, University of Pennsylvania School of Medicine, Consultant and Senior Fellow, Mack Center for Technological Innovation | |
| 13. | TH 2/23 | EMERGING TECHNOLOGIES—PAST, PRESENT, FUTURE | <u>RP #1</u> |

III. LEVERAGING EXTERNAL SOURCES OF INNOVATION: STRATEGIC PARTNERSHIPS

14. TU 2/28 **DECIDING BETWEEN INNOVATION STRATEGIES**
 Organizing for Innovation: When is Virtual Virtuous? (*Skim*) BP: 22
 When to Ally and When to Acquire BP: 23
 Monsanto's March into Biotechnology (A) BP: 24
15. TH 3/01 **VENTURE CAPITAL AND TECHNOLOGICAL INNOVATION** **RP #2 Proposal**
Guest Resource: Ted Schlein, Managing Partner, Kleiner Perkins Caufield & Byers

SPRING BREAK 3/5/12 – 3/9/12

16. TU 3/13 **MANAGING STRATEGIC ALLIANCES**
 How to Make Strategic Alliances Work (*Skim*) BP: 25
 The Relational View: Cooperative Strategy... BP: 26
 Lipitor: At the Heart of Warner-Lambert BP: 27
17. TH 3/15 **MANAGING ALLIANCE NETWORKS**
 Constellation Strategy: Managing Alliance Groups BP: 28
 Strategy as Ecology (*Skim*) BP: 29
 Star Alliance, 2000 **BP: 30**
 Smarter Ways to Do Business with the Competition **BP: 31**
 Star Alliance Seeks Integration **BP: 32**
 Star Alliance Cuts Costs to Stay Ahead **BP: 33**
18. TU 3/20 **ENGAGING IN STRATEGIC OUTSOURCING**
Guest Resource: Sandeep Kishore, Executive Vice President and Global Head of
 Sales & Practice, Engineering and R&D Services, HCL Technologies
 HCL Technologies Brochure WC: 18
 HCL Engineering and R&D Services Pre Reading Material WC: 19
 Looking Beyond the Product: How Top Medical Companies... WC: 20
19. TH 3/22 **ENGAGING IN CORPORATE VENTURING** **RP #2 Outline**
 Making Sense of Corporate Venture Capital BP: 34
 Intel Capital: The Berkeley Networks Investment BP: 35
20. TU 3/27 **PERSPECTIVES ON STRATEGIC TECHNOLOGY MANAGEMENT** **AB #2**

IV. LEVERAGING EXTERNAL SOURCES OF INNOVATION: MERGERS AND ACQUISITIONS

21. TH 3/29 **GROWING THROUGH ACQUISITIONS**
 Capturing the Real Value in High-Tech Acquisitions BP: 37
 The Influence of Organizational Acquisition Experience... (*Focus on concepts/findings*) BP: 38
 Cisco's Acquisition Strategy (1993 to 2000): Value Growth... BP: 39
22. TU 4/03 **DETERMINING INTEGRATION STRATEGIES**
 Buying Innovation: Managing Technology-Based Acquisitions BP: 43
 Vermeer Technologies (D), (E), (F) **BP: 44**
 Post-Merger Integration: How IBM and Lotus Work Together (*Skim*) BP: 45
23. TH 4/05 **GLOBAL M&A BY EMERGING-MARKET MULTINATIONALS**
 What Have We Learned About Emerging-Market MNEs? (*Skim*) BP: 46
 China's Track Record in M&A (*Skim*) BP: 47
 Lenovo Evolves with Its IBM PC Unit in Tow BP: 48
 Big Deal? (*Skim*) BP: 49
 Merger, Indian Style: Buy a Brand, Leave It Alone BP: 50
 Global Integration the Cemex Way BP: 51
 No Small Beer Empire BP: 52

V. PROJECTS AND REVIEW

24. TU 4/10 **RP #2 PRESENTATIONS (1/2)**
25. TH 4/12 **RP #2 PRESENTATIONS (2/2)**
26. TU 4/17 **KEY ISSUES & OPTIONS IN TECHNOLOGY MANAGEMENT** **C&P**
27. TH 4/19 **WINDOW ON TECHNOLOGICAL INNOVATION**
Guest Resource: Ken Glass, Angel Investor (M&T, '82)
- TU 4/24 **Research Papers Due by 5:00pm (No Class)** **RP #2**

Bulkpack Readings**TABLE OF CONTENTS:**

1. Innovation in Industry
2. Out of the Dusty Labs
3. Technological Innovation in the Photographic Industry
4. Patterns of Industrial Innovation
5. The Dynamics of Technology and Strategy
6. Timex Corporation (A) and (B)
7. Technology Leadership Can Pay Off
8. Technology and Competitive Advantage: The Role of General Management
9. Strategies for Global R&D
10. Technology Map of the World
11. Toyota and Sony: R&D Alone is Not Enough
12. India and China Wise Up to Innovation
13. Managing Real Options
14. Developing Products on Internet Time
15. Silicon Valley Specialists Case
16. Masters of Innovation: How 3M Keeps its New Products Coming
17. GE Sees the Light
18. Built for Innovation
19. Putting the "I" into HP
20. Entrepreneurship
21. Hermes Systems
22. Organizing for Innovation: When is Virtual Virtuous?
23. When to Ally and When to Acquire
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26. The Relational View: Cooperative Strategy and Sources of Interorganizational Competitive Advantage
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32. Star Alliance Seeks Integration
33. Star Alliance Cuts Costs to Stay Ahead
34. Making Sense of Corporate Venture Capital
35. Intel Capital: The Berkeley Networks Investment
- ~~36. R&D Services at Wipro Technologies: Outsourcing Innovation?~~
37. Capturing the Real Value in High-Tech Acquisitions
38. The Influence of Organizational Acquisition Experience on Acquisition Performance...
39. Cisco's Acquisition Strategy
- ~~40. Making M&A's Work: Strategic and Psychological Preparation~~
- ~~41. HP and Compaq Combined: In Search of Scale and Scope~~
- ~~42. DaimlerChrysler Merger: The Quest to Create "One Company"~~
43. Buying Innovation: Managing Technology-Based Acquisitions
44. Vermeer Technologies (D), (E), (F)
45. Post-Merger Integration: How IBM and Lotus Work Together
46. What Have We Learned About Emerging-Market MNEs?
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48. Lenovo Evolves with Its IBM PC Unit in Tow
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51. Global Integration the Cemex Way
52. No Small Beer Empire

WebCafé Readings**TABLE OF CONTENTS:**

1. This Way to the Future
2. The Unexpected Science to Come
3. 10 Emerging Technologies 2011
4. Century of the Sciences
5. Why Good Companies Go Bad
6. Managing Technology as a Strategic Asset
7. Office of Technology Policy Report "The Global Context of the U.S. Technology Policy"
8. 2012 Global R&D Funding Forecast Report
9. The Fading Lustre of Clusters
10. The Art of Standards Wars
11. Battle for Cloud Productivity: Office 365 vs. Google Apps
12. Revving Up
13. Growing Through Innovation
14. 3M's Innovation Crisis
15. The World's Most Innovative Companies
16. Lessons from Apple
17. Radical Collaboration: Lessons from IBM's Innovation Factory
18. HCL Technologies Brochure
19. HCL Engineering and R&D Services Pre Reading Material
20. Looking Beyond the Product: How Top Medical Companies are Engineering Solutions, Not Just Devices...