

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 215

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

Course Assistants: Avantika Agrawal, Phillip Baker, Juhi Heda, Huanwu Li, Joy Xu

webCafe: <https://webcafe.wharton.upenn.edu/eRoom/mgmt/237-sp10-1>

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

WebCafe (WC): Supplementary assigned articles on WebCafe

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 1/14 | 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 (<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 1/19 | 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 1/21 | 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 1/26 | 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 | T: 6
BP: 7
BP: 8
WC: 6 |
| 5. | TH 1/28 | WINDOW ON TECHNOLOGICAL INNOVATION
<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"
Battelle 2010 Global R&D Funding Forecast Report
The Fading Lustre of Clusters | <u>RP #1 Proposal</u>

WC: 7
WC: 8
WC: 9 |
| 6. | TU 2/02 | PERSPECTIVES ON EMERGING TECHNOLOGY | <u>AB #1</u> |

II. MANAGING TECHNOLOGICAL INNOVATION AND NEW PRODUCT DEVELOPMENT

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| 7. | TH 2/04 | TECHNOLOGY AND COMPETITIVE ADVANTAGE
Standards Battles and Design Dominance (<i>Skim</i>)
The Art of Standards Wars
Battle of the Smartphones: BlackBerry vs. iPhone | T: 4
WC: 10
WC: 17 |
| 8. | TU 2/09 | 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: 10
BP: 11
BP: 12
BP: 13
WC: 11
WC: 12 |
| 9. | TH 2/11 | 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: 14
T: 11
BP: 15
BP: 16 |
| 10. | TU 2/16 | 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: 17
BP: 18
BP: 19
BP: 20
WC: 13
WC: 14
WC: 15
WC: 16 |
| 11. | TH 2/18 | TECHNOLOGICAL INNOVATION, ENTREPRENEURSHIP, AND ORGANIZATION
Organizing for Innovation
Entrepreneurship (<i>Skim</i>)
Hermes Systems | T: 10
BP: 21
<u>BP: 22</u> |
| 12. | TU 2/23 | WINDOW ON TECHNOLOGICAL INNOVATION
<u>Guest Resource:</u> Terry Fadem, Director, Corporate Alliances, University of Pennsylvania School of Medicine, Consultant and Senior Fellow, Mack Center for Technological Innovation | |
| 13. | TH 2/25 | EMERGING TECHNOLOGIES—PAST, PRESENT, FUTURE | <u>RP #1</u> |

III. LEVERAGING EXTERNAL SOURCES OF INNOVATION: STRATEGIC PARTNERSHIPS

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| 14. | TU 3/02 | DECIDING BETWEEN INNOVATION STRATEGIES
Organizing for Innovation: When is Virtual Virtuous? (<i>Skim</i>)
When to Ally and When to Acquire
Monsanto's March into Biotechnology (A) | BP: 23
BP: 24
BP: 25 |
| 15. | TH 3/04 | MANAGING STRATEGIC ALLIANCES
How to Make Strategic Alliances Work (<i>Skim</i>)
The Relational View: Cooperative Strategy...
Lipitor: At the Heart of Warner-Lambert | <u>RP #2 Proposal</u>
BP: 26
BP: 27
BP: 28 |

SPRING BREAK 3/8/10 – 3/12/10

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| 16. | TU 3/16 | MANAGING ALLIANCE NETWORKS
Constellation Strategy: Managing Alliance Groups
Strategy as Ecology (<i>Skim</i>)
Star Alliance, 2000
Smarter Ways to Do Business with the Competition
Star Alliance Seeks Integration
Star Alliance Cuts Costs to Stay Ahead | BP: 29
BP: 30
BP: 31
BP: 32
BP: 33
BP: 34 |
| 17. | TH 3/18 | ENGAGING IN CORPORATE VENTURING
Making Sense of Corporate Venture Capital
Intel Capital: The Berkeley Networks Investment | BP: 35
<u>BP: 36</u> |
| 18. | TU 3/23 | ENGAGING IN STRATEGIC OUTSOURCING OF PERIPHERAL TO CORE ACTIVITIES
<u>Guest Resource:</u> Sachin Mulay, Wipro Technologies
R&D Services at Wipro Technologies: Outsourcing Innovation? | BP: 37 |
| 19. | TH 3/25 | PERSPECTIVES ON STRATEGIC TECHNOLOGY MANAGEMENT | <u>AB #2</u>
<u>RP#2 Outline</u> |

IV. LEVERAGING EXTERNAL SOURCES OF INNOVATION: MERGERS AND ACQUISITIONS

20. TU 3/30 **GROWING THROUGH ACQUISITIONS**
 Capturing the Real Value in High-Tech Acquisitions BP: 38
 The Influence of Organizational Acquisition Experience... *(Focus on concepts/findings)* BP: 39
 Cisco's Acquisition Strategy (1993 to 2000): Value Growth... BP: 40
21. TH 4/01 **EMBARKING ON INTEGRATION PLANNING**
 Making M&As Work: Strategic and Psychological Preparation BP: 41
 HP and Compaq Combined: In Search of Scale and Scope BP: 42
 DaimlerChrysler Merger: The Quest to Create "One Company" BP: 43
22. TU 4/06 **DETERMINING INTEGRATION STRATEGIES**
 Buying Innovation: Managing Technology-Based Acquisitions BP: 44
 Vermeer Technologies (D), (E), (F) **BP: 45**
 Post-Merger Integration: How IBM and Lotus Work Together *(Skim)* BP: 46
23. TH 4/08 **GLOBAL M&A BY EMERGING-MARKET MULTINATIONALS**
 What Have We Learned About Emerging-Market MNEs? *(Skim)* BP: 47
 China's Track Record in M&A *(Skim)* BP: 48
 Lenovo Evolves with Its IBM PC Unit in Tow BP: 49
 Big Deal? *(Skim)* BP: 50
 Merger, Indian Style: Buy a Brand, Leave It Alone BP: 51
 Global Integration the Cemex Way BP: 52
 No Small Beer Empire BP: 53

V. PROJECTS AND REVIEW

24. TU 4/13 **FINAL TEAM PRESENTATIONS (1/2)**
25. TH 4/15 **FINAL TEAM PRESENTATIONS (2/2)**
26. TU 4/20 **WINDOW ON TECHNOLOGICAL INNOVATION**
Guest Resource: Ken Glass (M&T, '82)
27. TH 4/22 **KEY ISSUES & OPTIONS IN TECHNOLOGY MANAGEMENT** **C&P**
- TU 4/27 **Team 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. The Browser Wars~~
10. Strategies for Global R&D
11. Technology Map of the World
12. Toyota and Sony: R&D Alone is Not Enough
13. India and China Wise Up to Innovation
14. Managing Real Options
15. Developing Products on Internet Time
16. Silicon Valley Specialists Case
17. Masters of Innovation: How 3M Keeps its New Products Coming
18. GE Sees the Light
19. Built for Innovation
20. Putting the "I" into HP
21. Entrepreneurship
22. Hermes Systems
23. Organizing for Innovation: When is Virtual Virtuous?
24. When to Ally and When to Acquire
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26. How to Make Strategic Alliances Work
27. The Relational view: Cooperative Strategy...
28. Lipitor: At the Heart of Warner-Lambert
29. Constellation Strategy: Managing Alliance Groups
30. Strategy as Ecology
31. Star Alliance, 2000
32. Smarter Ways to Do Business with the Competition
33. Star Alliance Seeks Integration
34. Star Alliance Cuts Costs to Stay Ahead
35. Making Sense of Corporate Venture Capital
36. Intel Capital: The Berkeley Networks Investment
37. R&D Services at Wipro Technologies: Outsourcing Innovation?
38. Capturing the Real Value in High-Tech Acquisitions
39. The Influence of Organizational Acquisition Experience
40. Cisco's Acquisition Strategy
41. Making M&A's Work: Strategic and Psychological Preparation
42. HP and Compaq Combined: In Search of Scale and Scope
43. DaimlerChrysler Merger: The Quest to Create "One Company"
44. Buying Innovation: Managing Technology-Based Acquisitions
45. Vermeer Technologies (D), (E), (F)
46. Post-Merger Integration: How IBM and Lotus Work Together
47. What Have We Learned About Emerging-Market MNEs?
48. China's Track Record in M&A
49. Lenovo Evolves with Its IBM PC Unit in Tow

Bulkpack Readings (Cont'd)

- 50. Big Deal?
- 51. Merger, Indian Style: Buy a Brand, Leave It Alone
- 52. Global Integration the Cemex Way
- 53. 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
- 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. Battelle 2010 Global R&D Funding Forecast Report
- 9. The Fading Lustre of Clusters
- 10. The Art of Standards Wars
- 11. Revving Up
- 12. Growing Through Innovation
- 13. 3M's Innovation Crisis
- 14. The World's Most Innovative Companies
- 15. Lessons from Apple
- 16. Radical Collaboration: Lessons from IBM's Innovation Factory
- 17. Battle of the Smartphones: BlackBerry vs. iPhone