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: Monday/Wednesday 1:30-3:00 p.m.

Place: JMHH F70

Instructor: Prof. Saikat Chaudhuri
3463 SHDH; saikatc@wharton.upenn.edu; 215-898-6387

Office Hours: Monday 4:30-6:30 p.m. (or by appointment)

Course Assistants: T. Balla, M. Grenader, A. Nadgauda, N. Narain, S. Weiss

Canvas Web Page: https://canvas.upenn.edu/courses/1436589

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


Bulk Pack (BP): Assigned Articles and Cases on Study.Net

Canvas (C): Assigned Articles, Cases, and Videos on Canvas

Library Websites: http://guides.library.upenn.edu/mgmt237 (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 everyone! 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

1. WE 1/16  THE NATURE OF TECHNOLOGICAL INNOVATION
   - Introduction (Skim)
   - Sources of Innovation (Skim)
   - Innovation in Industry (Skim)
   - Out of the Dusty Labs (Skim)
   - This Way to the Future (Skim)
   - The Unexpected Science to Come (Skim)
   - 10 Breakthrough Technologies 2018 (Skim)
   - Century of the Sciences (Skim)

2. MO 1/28  THE STRATEGIC IMPACT OF TECHNOLOGICAL CHANGE
   - Avoiding Innovation's Terrible Toll (Skim)
   - Types and Patterns of Innovation
   - Why Good Companies Go Bad (Skim)
   - Timing of Entry
   - Technological Innovation in the Photographic Industry (Skim)

3. WE 1/30  INNOVATION PATTERNS AND EMERGING VS. ESTABLISHED TECHNOLOGIES
   - Patterns of Industrial Innovation
   - The Dynamics of Technology and Strategy (Skim)

4. MO 2/04  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

5. WE 2/06  TECHNOLOGY POLICY AND REGULATION
   - Guest Resource: Dr. Michael Mandel, Chief Economic Strategist, Progressive Policy Institute and Senior Fellow, Mack Institute for Innovation Management
   - Robots Will Save the Economy (Skim)
   - Facebook, Twitter and Social Media’s Road to Federal Regulation (Skim)
   - New Drug Approvals Hit 21-Year High in 2017 (Skim)
   - Converting Permissionless Innovation into Public Policy: 3 Reforms (Skim)

6. MO 2/11  PERSPECTIVES ON EMERGING TECHNOLOGY

MO 1/21  Martin Luther King, Jr. Day (No Class)
WE 1/23  Time for RP #1 Work (No Class)
II. MANAGING TECHNOLOGICAL INNOVATION AND NEW PRODUCT DEVELOPMENT

7. WE 2/13  TECHNOLOGY AND COMPETITIVE ADVANTAGE
Standards Battles and Design Dominance *(Skim)*
The Art of Standards Wars
Battle in Gene-Editing: CRISPR vs. ZFN/TALEN Tools *(Self-research)*

8. MO 2/18  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

WE 2/20  Snow Day (No Class)

9. MO 2/25  MANAGING TECHNOLOGY STRATEGIES AND THE INNOVATION PROCESS
Choosing Innovation Projects
Managing Real Options *(Skim)*
Managing the New Product Development Process
Developing Products on Internet Time
Silicon Valley Specialists

10. WE 2/27  LESSONS FROM INNOATIVE 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 2018
Lessons from Apple
Radical Collaboration: Lessons from IBM’s Innovation Factory

SPRING BREAK 3/04 – 3/08

11. MO 3/11  TECHNOLOGICAL INNOVATION, ENTREPRENEURSHIP, AND ORGANIZATION
Organizing for Innovation
Entrepreneurship *(Skim)*
Hermes Systems

12. WE 3/13  WINDOW ON TECHNOLOGICAL INNOVATION
Guest Resource: Justin Reilly, Entrepreneur and Former Head of Customer Experience Innovation, Verizon

13. MO 3/18  EMERGING TECHNOLOGIES—PAST, PRESENT, FUTURE  RP #1
III. LEVERAGING EXTERNAL SOURCES OF INNOVATION: STRATEGIC PARTNERSHIPS

14. WE 3/20 DECIDING BETWEEN INNOVATION STRATEGIES
   - Organizing for Innovation: When is Virtual Virtuous? (Skim)
   - When to Ally and When to Acquire
   - Monsanto’s March into Biotechnology (A)

15. MO 3/25 MANAGING STRATEGIC ALLIANCES
   - How to Make Strategic Alliances Work (Skim)
   - The Relational View: Cooperative Strategy…
   - Lipitor: At the Heart of Warner-Lambert

16. WE 3/27 ENGAGING IN STRATEGIC OUTSOURCING
   - Guest Resource: Sreedhar Chittamuri, Vice President & Head of Engineering and Operations for Aerospace and Defense, HCL Technologies
   - Engineering Services Outsourcing: Unraveling Myths (Skim)

17. MO 4/01 MANAGING ALLIANCE NETWORKS
   - Constellation Strategy: Managing Alliance Groups
   - Strategy as Ecology (Skim)
   - Star Alliance, 2000
   - Smarter Ways to Do Business with the Competition
   - Star Alliance Seeks Integration
   - Star Alliance Cuts Costs to Stay Ahead

18. WE 4/03 ENGAGING IN CORPORATE VENTURING
   - Making Sense of Corporate Venture Capital
   - Intel Capital: The Berkeley Networks Investment

19. MO 4/08 PERSPECTIVES ON STRATEGIC TECHNOLOGY MANAGEMENT

RP #2 Proposal
BP: 23
BP: 24
BP: 25
BP: 26
BP: 27
BP: 28
BP: 29
BP: 30
BP: 31
BP: 32
BP: 33
BP: 34
BP: 35
BP: 36
AB #2
IV. LEVERAGING EXTERNAL SOURCES OF INNOVATION: MERGERS AND ACQUISITIONS

20. WE 4/10 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

21. MO 4/15 DETERMINING INTEGRATION STRATEGIES
Buying Innovation: Managing Technology-Based Acquisitions BP: 40
The MegaMicro Jentronix Transaction and Integration Decisions BP: 41

22. WE 4/17 DISCUSSION OF CURRENT DEALS AND DEVELOPMENTS
Cases to Be Announced in Prior Class

23. MO 4/22 LEADERSHIP IN M&A AND ALLIANCES
Robert Iger on Acquisition Decision-Making (Disney) C: 21
Padmasree Warrior on Acquisition Implementation (Cisco) C: 22
Charles Giancarlo on Acquisition Implementation (Cisco) C: 23
Juergen Schrempp on Merger Challenges (Daimler-Chrysler) C: 24
Dieter Zetsche on Merger Challenges (Daimler-Chrysler) C: 25
Carlos Ghosn on Alliance Decision-Making and Implementation (Renault-Nissan) C: 26
Jaan Albrecht on Creating and Managing Ecosystems/Alliance Networks (Star Alliance) C: 27

24. WE 4/24 GLOBAL M&A BY EMERGING-MARKET MULTINATIONALS
What Have We Learned About Emerging-Market MNEs? (Skim) BP: 43
Don’t Integrate Your Acquisitions, Partner with Them BP: 44
China’s Track Record in M&A (Skim) BP: 45
Lenovo Evolves with Its IBM PC Unit in Tow BP: 46
Big Deal? (Skim) BP: 47
Merger, Indian Style: Buy a Brand, Leave It Alone BP: 48
Global Integration the Cemex Way BP: 49
No Small Beer Empire BP: 50

V. PROJECTS AND REVIEW

25. MO 4/29 KEY ISSUES & OPTIONS IN TECHNOLOGY MANAGEMENT C&P
WE 5/01 RP #2 Papers Due by 5:00pm (No Class) RP #2

26. TH 5/23 RP #2 PRESENTATIONS (Wharton San Francisco)
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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)  
7. Timex Corporation (B)  
8. Technology Leadership Can Pay Off  
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  
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  
25. Monsanto’s March into Biotechnology (A)  
26. How to Make Strategic Alliances Work  
27. The Relational View: Cooperative Strategy and Sources of Interorganizational Competitive Advantage  
28. Lipitor: At the Heart of Warner-Lambert  
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31. Star Alliance, 2000  
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34. Star Alliance Cuts Costs to Stay Ahead  
35. Making Sense of Corporate Venture Capital  
36. Intel Capital: The Berkeley Networks Investment  
37. Capturing the Real Value in High-Tech Acquisitions  
38. The Influence of Organizational Acquisition Experience on Acquisition Performance…  
40. Buying Innovation: Managing Technology-Based Acquisitions  
41. The MegaMicro Jentronix Transaction and Integration Decisions  
42. The MegaMicro Jentronix Transaction and Integration Simulation User’s Guide  
43. What Have We Learned About Emerging-Market MNEs?  
44. Don’t Integrate Your Acquisitions, Partner with Them  
45. China’s Track Record in M&A  
46. Lenovo Evolves with Its IBM PC Unit in Tow  
47. Big Deal?  
48. Merger, Indian Style: Buy a Brand, Leave It Alone  
49. Global Integration the Cemex Way  
50. No Small Beer Empire
## Canvas Readings and Videos

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1. This Way to the Future
2. The Unexpected Science to Come
3. 10 Breakthrough Technologies 2018
4. Century of the Sciences
5. Avoiding Innovation's Terrible Toll
6. Why Good Companies Go Bad
7. Outside the Box
8. Managing Technology as a Strategic Asset
9. Robots Will Save the Economy
10. Facebook, Twitter and Social Media’s Road to Federal Regulation
11. New Drug Approvals Hit 21-Year High in 2017
12. Converting Permissionless Innovation into Public Policy: 3 Reforms
13. The Art of Standards Wars
14. Revving Up
15. Growing Through Innovation
16. 3M’s Innovation Crisis
17. The World’s Most Innovative Companies 2018
18. Lessons from Apple
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