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 F55

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

Office Hours:  Monday 3:30-5:30 p.m. (or by appointment)

Course Assistants: Tanusri Balla, Moksh Jawa, Isaac Schrof, Spencer Weiss, Jason Xian

Canvas Web Page: https://canvas.upenn.edu/courses/1489388

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 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/](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 1/15  THE NATURE OF TECHNOLOGICAL INNOVATION
   Introduction (Skim) T: 1
   Sources of Innovation (Skim) T: 2
   Innovation in Industry (Skim) BP: 1
   Out of the Dusty Labs (Skim) BP: 2
   This Way to the Future (Skim) C: 1
   The Unexpected Science to Come (Skim) C: 2
   10 Breakthrough Technologies 2019 (Skim) C: 3
   Century of the Sciences (Skim) C: 4

   MO 1/20  Martin Luther King, Jr. Day (No Class)

   WE 1/22  Time for RP #1 Work (No Class)

2. MO 1/27  THE STRATEGIC IMPACT OF TECHNOLOGICAL CHANGE
   Avoiding Innovation's Terrible Toll (Skim) C: 5
   Types and Patterns of Innovation T: 3
   Why Good Companies Go Bad (Skim) C: 6
   Timing of Entry T: 5
   Technological Innovation in the Photographic Industry (Skim) BP: 3
   Outside the Box (Skim) C: 7

3. WE 1/29  INNOVATION PATTERNS AND EMERGING VS. ESTABLISHED TECHNOLOGIES
   Patterns of Industrial Innovation BP: 4
   The Dynamics of Technology and Strategy (Skim) BP: 5
   Timex Corporation (A) and (B) BP: 6, 7

4. MO 2/03  TECHNOLOGICAL INNOVATION AND STRATEGIC MANAGEMENT
   Defining the Organization’s Strategic Direction T: 6
   Technology Leadership Can Pay Off BP: 8
   Technology and Competitive Advantage: The Role of General Management BP: 9
   Managing Technology as a Strategic Asset (Skim) C: 8

5. WE 2/05  TECHNOLOGY POLICY AND REGULATION
   Guest Resource: Dr. Michael Mandel, Chief Economic Strategist, Progressive Policy Institute and Senior Fellow, Mack Institute for Innovation Management
   This Was the Decade the Commercial Spaceflight Industry Leapt Forward (Skim) C: 9
   Better Policies and Incentives to Revitalize R&D for New Antimicrobial Drugs (Skim) C: 10
   Tech Giants Want Rules on Facial Recognition, But Critics Warn… (Skim) C: 11A
   Illinois Employers Must Comply with Artificial Intelligence Video Interview Act (Skim) C: 11B
   No One Is Ready for California’s New Consumer Privacy Law (Skim) C: 11C
   Converting Permissionless Innovation into Public Policy: 3 Reforms (Skim) C: 12

6. MO 2/10  PERSPECTIVES ON EMERGING TECHNOLOGY
II. MANAGING TECHNOLOGICAL INNOVATION AND NEW PRODUCT DEVELOPMENT

7. WE 2/12  TECHNOLOGY AND COMPETITIVE ADVANTAGE
Standards Battles and Design Dominance *(Skim)*
The Art of Standards Wars
Battle for the Gaming Monitor: G-Sync vs. FreeSync VRR Technologies *(Self-research)*

8. MO 2/17  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

9. WE 2/19  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. MO 2/24 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 2018*
Lessons from Apple
Radical Collaboration: Lessons from IBM’s Innovation Factory

11. WE 2/26  TECHNOLOGICAL INNOVATION, ENTREPRENEURSHIP, AND ORGANIZATION
Organizing for Innovation
Entrepreneurship *(Skim)*
Hermes Systems

12. MO 3/02 WINDOW ON TECHNOLOGICAL INNOVATION
Guest Resource: Sid Kumar, Head of Americas Sales Strategy & Operations, Amazon Web Services

13. WE 3/04  EMERGING TECHNOLOGIES—PAST, PRESENT, FUTURE

SPRING BREAK 3/09 – 3/13
III. LEVERAGING EXTERNAL SOURCES OF INNOVATION: STRATEGIC PARTNERSHIPS

14. MO 3/16  DECIDING BETWEEN INNOVATION STRATEGIES  
Organizing for Innovation: When is Virtual Virtuous? (Skim)  BP: 23  
When to Ally and When to Acquire  BP: 24  
Monsanto’s March into Biotechnology (A)  BP: 25

15. WE 3/18  MANAGING STRATEGIC ALLIANCES  
How to Make Strategic Alliances Work (Skim)  BP: 26  
The Relational View: Cooperative Strategy…  BP: 27  
Lipitor: At the Heart of Warner-Lambert  BP: 28

16. MO 3/23  MANAGING ALLIANCE NETWORKS  
Constellation Strategy: Managing Alliance Groups  BP: 29  
Strategy as Ecology (Skim)  BP: 30  
Star Alliance, 2000  BP: 31  
Smarter Ways to Do Business with the Competition  BP: 32  
Star Alliance Seeks Integration  BP: 33  
Star Alliance Cuts Costs to Stay Ahead  BP: 34

17. WE 3/25  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)  C: 20

18. MO 3/30  ENGAGING IN CORPORATE VENTURING  
Making Sense of Corporate Venture Capital  BP: 35  
Intel Capital: The Berkeley Networks Investment  BP: 36

19. WE 4/01  PERSPECTIVES ON STRATEGIC TECHNOLOGY MANAGEMENT  AB #2
IV. LEVERAGING EXTERNAL SOURCES OF INNOVATION: MERGERS AND ACQUISITIONS

20. MO 4/06  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. WE 4/08  DETERMINING INTEGRATION STRATEGIES
Buying Innovation: Managing Technology-Based Acquisitions  BP: 40
The MegaMicro Jentronix Transaction and Integration Decisions  BP: 41

22. MO 4/13  DISCUSSION OF CURRENT DEALS AND DEVELOPMENTS
Cases to Be Announced in Prior Class

23. WE 4/15  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. MO 4/20  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. WE 4/22  KEY ISSUES & OPTIONS IN TECHNOLOGY MANAGEMENT  C&P
MO 4/27  Time for RP #2 Work (No Class)
WE 4/29  RP #2 Papers Due by 5:00pm (No Class)  RP #2

26. TH 5/21  RP #2 PRESENTATIONS (Wharton San Francisco)
Bulk Pack Readings

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3. Technological Innovation in the Photographic Industry
4. Patterns of Industrial Innovation
5. The Dynamics of Technology and Strategy
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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
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35. Making Sense of Corporate Venture Capital
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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
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11. A. Tech Giants Want Rules on Facial Recognition, But Critics Warn That Won't Be Enough
   B. Illinois Employers Must Comply with Artificial Intelligence Video Interview Act
   C. No One Is Ready for California’s New Consumer Privacy Law
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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