

國立台灣大學商學研究所

科技管理

Management of Technology

Fall, 2007 (Thursday 16:20-:18:00)

Instructor: 陳文華 教授 (管院二館 711 室, 33661048, andychen@ntu.edu.tw)

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I. Course Overview

Technology influences what strategies a firm should choose and how managers should implement them. This course considers the competitive challenges created by technology, and explores how successful managers can meet these challenges.

This course provides a framework for managing innovations in businesses. The emphasis throughout is on the development and application of models and analytical tools that clarify the interactions between competition, new ideas, patterns of technological and market change, and the structure and development of internal capabilities. The course also examines the challenge to building and maintaining an innovative organization, and how individuals can successfully innovate in organizations. These tools can provide the framework for insightful planning when deciding how to structure your organization to innovate, how to manage groups that are innovating, which initiatives to invest in, how to structure your resources to gain competitive advantage over other industry participants, and how to use your capabilities to exploit innovative activities. The course should be of particular interest to those interested in managing a business where external or internal innovation is a necessity for competition, those interested in new business ventures, and consulting.

This course focuses on the strategic management of technology and innovation in established firms. The conceptual framework of the course is an evolutionary process perspective on technology strategy and innovation. The fundamental ideas underlying this evolutionary perspective are (1) that a firm's technology strategy emerges from its technological competencies and capabilities, (2) that technology strategy is shaped by external (environmental) and internal (organizational) forces, and (3) that the enactment of technology strategy, through the experience that it generates, serves to further develop the firm's technological competencies and capabilities. Within this evolutionary perspective, the course draws on strategic management, economics and organizational theory for analytical tools to address important challenges faced by managers in technology-based firms.

The specific course objectives include:

1. To develop an awareness of the range, scope, and complexity of the issues and problems related to the strategic management of technology and innovation.
2. To develop an understanding of the "state of the art" of the strategic

- management of technology and innovation.
3. To develop a conceptual framework for assessing and auditing the innovative capabilities of a business organization.
 4. To develop insight concerning the skills necessary to be effective as a general manager in the innovation process.
 5. To offer some practice in defining and working out strategic management problems related to technological innovation and corporate entrepreneurship.

II. Course Materials

A course packet of all of the class material is available. Class slides will be distributed the day of each class. After class, the material can be downloaded from class folder.

III. Grading Policy

陳文華	陳忠仁
Class Participation+ 4@2-pager 30%	Class Participation 20%
Mid-Term Paper 20%	Final Exam 30%

1. General Expectations for Memo Assignments Linked to Cases Assigned

I will grade these memos based on the following criteria:

- Demonstrates critical thinking about the situation.
- Conveys ideas clearly, concisely, persuasively.
- Incorporates course concepts.
- Organizes presentation so it is easy to follow

Length Guidelines:

These memos should be *no longer* than two pages, single-spaced or four pages if they are double-spaced. Please use a 12-point font, with one inch margins. (You are allowed to put all related supporting evident as figures and tables attached to the report, but limited to maximum 6 pages.) Your first draft is likely to be longer, so you will need to edit. A shorter memo takes more time.

Some tips:

- Use standard memo format – begin with lines for To:, From:, Subject:, Date:.
- Establish the purpose of your memo in the opening paragraph.
- Demonstrate that you have read and understand the case, but don't spend too much space re-hashing a long list of facts from the case. Instead, show that you can extend the facts through interpretation, insight, and links with course concepts.
- Use active voice.
- Avoid jargon.
- Ask yourself: "Would I be persuaded by this argument if someone presented it to

me?”

- Use headers to separate sections, where appropriate (this is usually a good idea).
- Follow the old saying: “Tell them what you are going to tell them, tell them, then tell them what you told them.”

2. Mid-term paper 20%

The mid-term paper consists of writing a case on a technology strategy dilemma faced by a firm. The project has three deliverables:

(3%) **Outline.** An outline (proposal) for the project is due **November 8**. The outline provides a mechanism for agreement on a project plan. By **November 22**, student should have met with me to discuss their plan

(12%) **Case Report.** The case report should be similar to a business case. It should identify a technological strategy problem faced by the firm, consider the industry context, the firm capabilities, and frame the problem. Please see the on-line examples for additional information. Case reports must be no more than 15 pages double spaced 12 point font. Up to 10 extra pages can be used for figures and tables. When possible, figures or tables should be presented on separate pages.

(5%) **Case Analysis.** The case should be accompanied by a written analysis of their company. This report must be no longer than 8 typed pages (12 point font, double-spaced, 1 inch margins), including cover and references. Up to 7 extra pages can be used for figures and tables.

The report is due by the end of the day on *January 24, 2008*.

IV. Summary Course Outline

*****PART I taught by 陳文華 教授 *****

Module I. Integrating Technology and Strategy

Session 1: 10/11 Technology Strategy in Action

1. Why Study MOT Lecture Note

Session 2: 10/18 Creating, Capturing and Delivering Value –I

1. Lecture Note on “How to acquire technologies?”

Case: BenQ’s Acquisition of Siemem’s Mobile Phone Unit (中文)

Prep Questions:

1. 明基為何要購併德國西門子手機部門？進入市場或喝獲取技術？
2. 明基的購併策略與作法上，有哪些是對的？有哪些是不適宜的？
3. 此購併案面臨的挑戰有哪些？應該如何做較為合適？
4. 明基下一步要怎麼做？

Session 3: 10/25 Creating, Capturing and Delivering Value –II

1. Profiting from Technological Innovation: Implications for Integration, Collaboration, Licensing, and Public Policy

Case: Keurig **(2-pager)

Prep Questions:

1. How attractive is the Keurig system to each of the following participants in the Office Coffee market?
 - A. The typical Office Coffee Distributor
 - B. The Coffee Roaster (use Green Mountain as typical)
 - C. Keurig
 - D. A typical Office Manager
 - E. The Coffee Drinking Employee
2. What advice do you have for Nick Lazaris concerning his dealings with MTS, the current vendor for the packaging line, and the other potential vendors? Be specific: What price goal would you have for the negotiation and what would your negotiating strategy be?
3. What advice do you have concerning the selection of the vendor for the brewing machine?
4. What actions should Keurig take to penetrate the Office Coffee Service market? Be specific: How should they price the brewing machine to the OCS distributors? How rapidly should they plan to grow and what should they do to avoid constraints on this growth plan?
5. What should they do about the Home coffee market segments? How soon should they plan to enter, and what specific actions should they be taking now to facilitate this entry?

Common assumptions used for analysis:

- A. Number of brewing units in offices = 1,937,000 (Exhibit 6)
- B. Number of cups consumed per brewing unit per day = 43 (p. 11)
- C. Number of work days per year = 250
- D. Number of cups consumed per year in offices = 20.8 billion (A*B*C)
- E. Current average cost of cup consumed = \$ 0.125/cup (Exhibit 6)
- F. Profit to Keurig per K-cup produced = \$0.04 (p. 5)
- G. Output per year for packaging line = 16.125 million K-cups (p.11 needed to support 1,500 brewers)
- H. Price per K-cup to office coffee distributor = \$0.25
- I. Price per K-cup to Office Manager = \$0.50

Session 4: 11/01 Technology S-Curve, and Industry Change

Case: Netflix **(2-pager)

Prep Questions:

1. What job do you think Netflix is offering to do for the consumer?

2. Would you characterize Netflix's initial offering as a new market disruption or a low-end disruption, or was it sustaining?
3. What were some of the key initial assumptions, and the discoveries that led to major changes in strategy?
4. What should Netflix do about the VOD offering?

Module II: Developing the Firm's Innovative Capabilities

Session 5: 11/08 Strategic Innovation (Business Models) -I

1. Open Business Model

Case: Infosys Consulting in 2006 ** (2-pager)

Prep Questions:

1. In 2006, how well is Infosys Technologies doing? What is the company's strategic position in the IT industry and what are its distinctive competencies? Where does it fit in the industry value chain? How would you describe its culture?
2. Why did Infosys Technologies decide to move into the IT consulting market segment? How big is this market segment and what is its structure? Why did they form a wholly owned subsidiary to enter this market segment?
3. In Raj Joshi's words, one of the goals of the leadership team of Infosys Consulting was to change the rules of the game. What are the "rules of the game" currently, and how is Infosys Consulting trying to change them? What do they mean by the "Global Delivery Model"?
4. How important are client relationships and institutional knowledge in the consulting industry? How would you assess Infosys Consulting's competencies in these two areas? Does Infosys Consulting have a sustainable competitive advantage? If so, what is it?
5. How are IBM and Accenture likely to view what Infosys Consulting is trying to do? How can they respond?
6. What interface challenges exist between Infosys Technologies and Infosys Consulting? To what extent do the parent company and subsidiary go to market together?
7. What are the challenges associated with managing growth for Infosys Consulting and for Infosys Technologies?
8. One of the challenges Steve Pratt faces is: How can Infosys Consulting stay ahead of the game? Please prepare an action plan for Infosys Consulting and assess the company's strengths and weaknesses to "stay ahead of the game" in terms of its strategic position, distinctive competencies, and culture.

Session 6: 11/15 Open Platform

1. Lecture Note on Idea Market and the trend of Open Source Code

Case: Google 2006 ** (2-pager)

Prep Questions:

1. What Explains Google’s Early Success?
2. Is Search a Winner-Take-All Category?
3. Could Google Outbid Microsoft for AOL’s Traffic?
4. What Should Google Do Next?
5. Is Google’s Unique Organization a Strength or Liability?

Session 7: 11/22 Mapping the Winds of Creative Destruction

1. Strategy Formulation and Inertia HBS Note

Case: Kodak and the Digital Revolution (A) **(2-pager)

Prep Questions:

1. Evaluate Kodak's strategy in traditional photography. Why has the company been so successful throughout the history of the industry?
2. Compare traditional photography to digital imaging. What are the main structural differences? Will digital imaging replace traditional imaging? How have value creation and value appropriation changed in digital photography relative to traditional photography?
3. Compare traditional photography to digital imaging. What are the main structural differences? Will digital imaging replace traditional imaging? How have value creation and value appropriation changed in digital photography relative to traditional photography?
4. How would you assess Fisher’s attempt to transform Kodak? Why did it fail?
5. What is Kodak's current position in digital imaging? Would Kodak's position be different had the company adopted a different digital imaging strategy in the eighties and the nineties? Evaluate Kodak's strategy from the mid-1980s onward.

Session 8: 11/29 Technology Change and Industry Dynamics

1. Racing to Acquire Customers
2. Course Wrap-up

Prep Questions:

1. As an organization how do you decide when to invest in an uncertain technology?
2. How does ‘increasing returns’ affect this decision?
3. What are danger signs of a ‘race to acquire customers’ gone bad?

The Syllabus for the Second Half of the Course

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TA: 林俊裕

Module III. Creating and Implementing a Development Strategy

Session 9: 12/6 Technology Strategy Formulation (I)

Class hand-out will be distributed and the below materials are the references of the hand-out.

1. Pappas (1984), Strategic Management of Technology, Journal of Product Innovation Management, 1, 30-35.
2. Maidique & Patch (1978), Corporate Strategy and Technological Policy.
3. Afuah (2003), Chapter 2, Innovation Management: Strategies, Implementation, and Profits, Oxford University Press Inc.
4. Christenson (2003), Chapters 2, 5, 8 The Innovator's Solution, Harvard Business School Publishing Corporation.
5. Kim & Mauborgne (2005), Chapter 1, Blue Ocean Strategy, Harvard Business School Publishing Corporation.

Session 10: 12/13 Technology Strategy Formulation (II)

Case I: Intel Corp.--1968-2003

Each group prepares a note answering the following questions:

1. How would you explain Intel's initial dominance and subsequent decline in DRAMs?
2. Why has Intel been more successful in microprocessors?
3. Evaluate Intel's shift in strategy under CEO Craig Barrett and new CEO Paul Otellini.
4. What are the significant challenges (internal and environmental) that Intel must face in 2003? What is your proposed action plan for Intel to solve the problems, with the rationale for the key strategic moves.

Session 11: 12/20 Technology Strategy Implementation (I)

Class hand-out will be distributed and the below materials are the references of the hand-out.

1. Christensen (2003), Chapters 7, 10, The Innovator's Solution, Harvard Business School Publishing Corporation.
2. Afuah (2003), Chapter 11, Innovation Management: Strategies, Implementation, and Profits, Oxford University Press Inc.
3. Tushman & O'Reilly (1996), Chapter 4, Winning Through Innovation, Harvard Business School Publishing Corporation
4. Prahalad & Hamel (1990), The Core Competence of the Corporation, Harvard Business Review, 79-91.
5. Leonard-Barton (1995), Chapters 1-7, Wellsprings of Knowledge, Harvard Business School Publishing Corporation
6. Nonaka & Takeuchi (1995), Chapters 3, 5, 6, The Knowledge-Creating Company, Oxford University Press, Inc.

Session 12: 12/27 Technology Strategy Implementation (I)

Case-Siemens AG Global Development Strategy (A)

Each group prepares a note answering the following questions:

1. How would you characterize Siemens' global development strategy? Why does it have regional development centers (RDCs) around the world?
2. What are the differences between RDCs in India, Germany, and the U.S.? How are these issues managed and resolved?
3. What has gone wrong with the ADMOSS and NetManager projects? Please consider the Bangalore and Munich perspectives.
4. What should senior management respond to the NetManager project crisis? a) Let Bangalore to solve it; b) Move all decision-making to Europe; or c) Move entire project to Europe. Describe your decision and the reasons.

Module IV. Managing Technology Partnerships & Environment

Session 13: 01/03 Managing Technology Partnerships & Networks (I)

Class hand-out will be distributed and the below materials are the references of the hand-out.

1. Afuah (2003), Chapter 4, Innovation Management: Strategies, Implementation, and Profits, Oxford University Press Inc.
2. Martin (1994), Chapter 13, Managing Innovation and Entrepreneurship in Technology Based Firms, John Wiley & Sons, Inc.
3. Economides, N. The economics of networks, International Journal of Industrial Organization, 14(2), March, 1996.

Session 14: 01/10 Managing Technology Partnerships & Networks (II)

Case-NTT DoCoMo, Inc. Mobile FeliCa

Each group prepares a note answering the following questions:

1. How successful do you predict Mobile FeliCa will be for DoCoMo? What will be the major sources of profit for DoCoMo from FeliCa? What are the major barriers to adoption for Mobile FeliCa? What steps should DoCoMo take to address these barriers?
2. How were i-mode and Mobile FeliCa similar and different in terms of network mobilization challenges?
3. Is DoCoMo wise to offer its existing mobile phone rivals access to FeliCa?
4. How should FeliCa Networks price its technology and services, now and in the future?
5. What strategy should DoCoMo pursue in eMoney? In credit cards?

Session 15: 01/17 Managing Technology Environments & Globalization

Class hand-out will be distributed and the below materials are the references of the hand-out.

1. Afuah (2003), Chapters 13, 14, Innovation Management: Strategies, Implementation,

- and Profits, Oxford University Press Inc.
2. Boutellier, Gassmann, von Zedtwitz (1999), *Managing Global Innovation*, Springer.
 3. Kim (1997), *Imitation to Innovation*, Harvard Business School Publishing Corporation.

Session 16: 01/24 Final Exam

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