

Course Outline

Course Code : BSN3701B
Course Title : Technological Innovation
Semester : Semester 2, Academic Year 2023-24
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Overview

This course aims to equip students with a strong conceptual foundation for understanding the dynamic process of technological innovation. Students will be introduced to the importance of technological innovation as a driver for value creation and economic growth. The dynamics of technological change will be analysed through concepts such as technology life-cycles, dominant design, network externalities, and first-mover advantage. This course has its foundations in theory and research but is practice oriented. This means that students will be exposed to the challenges in technological innovation through case studies of real world companies.

Course Objectives

The course develops frameworks for understanding strategic issues confronted by firms in technology-intensive industries. The focus in the course will always be on strategic issues rather than on descriptions of complex technologies. Students are not required to have a technical background to take this course. However, given the emphasis on the case method, students need to prepare to discuss and debate in class.

By the end of this course, students will be able to

- Develop a strong conceptual foundation in terms of - leadership, organizational, and environmental factors, influencing the process of technological innovations.
- Develop and demonstrate critical thinking mindset by analysing different cases discussed in class.
- Conduct analysis on the technology strategy of existing firms, and make recommendations for future strategy.

Course Materials

This course requires a fair amount of reading and reflection in between classes. You can find the reading material assigned to each lesson in the schedule below. This is no required textbook for the course.

I expect you to read the assigned material **before** each class. During the class, we will focus on discussions, analysis, and exercises.

Assessment

I hope that your focus in this class will be on learning rather than on the grade you will receive. If you learn a lot, you can pretty much count on your grade coming along as well. That said, your grade will be made up of:

1. Class Contribution	35%
2. Individual Case Analysis	20%
3. Group Project	45%

1. Class Contribution: Attendance and Participation in Class Discussions (35%)

This is a case-based course. To be prepared for class, you must read and think about assignments in advance of class. Evaluation of your participation will be based on your ability to contribute comments that are insightful, relevant and progressive (i.e., comments that add on to what is being said and move the discussion forward, rather than restate what has already been said). I will be looking for quality in your participation and you will not need significant “airtime” to earn a high participation grade (if you put forth a single, key insight and that is all you contribute to a session, you will receive the maximum class participation grade for that session).

To aid you in preparing for class discussion, I will distribute key questions for each case that will foreshadow the direction of the in-class discussions. Please come to every class prepared to discuss the case at hand.

As a significant proportion of the grade is tied to class participation, it is important that you attend all class sessions. Missing a class will affect your own and your classmates’ experience in the class. Attendance will be recorded every week.

2. Individual Case Analysis (20%)

Students will be submitting their analysis on the assigned case study. Each individual submission should not exceed 5 pages (12 point font, 1 inch margins, double spaced). Some guidelines and expectations:

- This is NOT case summary. Beyond a brief introduction of the company, you should avoid simply describing the case. Be analytical.
- The purpose of the case is to provide information for you to illustrate your statements and defend your points.
- Focus. Aim for depth rather than breadth. You are encouraged to use the concepts from recommended readings as well.

3. Group Project: Company Assessment (Total: 45%)

In a group of 5 members, you will be asked to perform an in-depth analysis of a company’s technology strategy and management. The report may be up to 15 pages in length (*1 inch margins, double spaced and 12 point font*) not including figures, financials, and other exhibits. It is highly recommended that you establish a contact at the company and spend some time interviewing company personnel, although field interviews are not strictly required to complete the assignment. All groups are expected to submit interim findings/plan in week 5, and the results of their research to the class towards the end of the semester.

Your report should describe the firm's technology strategy and the important strategic issues that confront the organization. Although not all of the following issues will be relevant to the situation you choose to analyze, you should identify and evaluate: the competitors of your firm, the stage of development of its industry, potential changes in the industry created by technological or market changes, sources of innovation for the industry and firm you are analyzing, your target's intellectual property position, its key competencies, the stage of development of its products, the appropriability regime it faces, its financial situation (access to capital, capital structure), the technical and managerial staffing issues that it faces, and the characteristics and strengths of its alliance portfolio. Through your analysis, you draw conclusions about the attractiveness and sustainability of your company's position and the industry segment that it occupies. If it helps, you can assume that you are either crafting a report to submit to potential investors in the firm, or submitting an external review of its current technology strategy to the firm's board.

The project should offer critical evaluation and it should draw heavily on the theoretical readings and frameworks that are covered in the class.

Assessment breakdown for group work:

- *Interim proposal and plan* 5%
- *Final presentations* 25%
- *Group Report* 15%

Academic Honesty & Plagiarism

Academic integrity and honesty is essential for the pursuit and acquisition of knowledge. The University and School expect every student to uphold academic integrity & honesty at all times. Academic dishonesty is any misrepresentation with the intent to deceive, or failure to acknowledge the source, or falsification of information, or inaccuracy of statements, or cheating at examinations/tests, or inappropriate use of resources.

Plagiarism is "the practice of taking someone else's work or ideas and passing them off as one's own" (The New Oxford Dictionary of English). The University and School will not condone plagiarism. Students should adopt this rule - You have the obligation to make clear to the assessor which is your own work, and which is the work of others. Otherwise, your assessor is entitled to assume that everything being presented for assessment is being presented as entirely your own work. This is a minimum standard. In case of any doubt, you should consult your instructor.

Additional guidance is available at:

- <http://www.nus.edu.sg/registrar/administrative-policies-procedures/acceptance-record#NUSCodeofStudentConduct>
- <http://nus.edu.sg/osa/resources/code-of-student-conduct>

Schedule and Outline

Note: Subject to change

Week 1: 19 Jan	Course Overview and Introduction Organization and Innovation
<i>Case</i>	EMI and the CT Scanner (A)
<i>Suggested Readings</i>	<ul style="list-style-type: none"> • Staw B.M., “Why No One Really Wants Creativity”, <i>Creative Action in Organizations</i> • Abernathy & Utterback, “Patterns of Industrial Innovation,” <i>Technology Review</i>
<i>Case Question</i>	<p>After reading the (A) case, stop and think about these questions:</p> <ol style="list-style-type: none"> 1. What predictions can you make about industry and competitive developments as of 1972? 2. Should EMI enter the CT scanner business? Why or why not? 3. How attractive is this business? Who will make the money in CT scanners and why?
Week 2: 26 Jan	Innovation and Strategy
<i>Case</i>	EMI and the CT Scanner (B)
<i>Suggested Readings</i>	<ul style="list-style-type: none"> • Staw B.M., “Why No One Really Wants Creativity”, <i>Creative Action in Organizations</i> • Abernathy & Utterback, “Patterns of Industrial Innovation,” <i>Technology Review</i>
<i>Case Question</i>	<ol style="list-style-type: none"> 1. How is EMI doing in the CT business in 1976? 2. How do you assess the company’s performance to date? 3. What should Powell do at the conclusion of the case?
Week 3: 2 Feb	Technological Change, Destruction and S Curves
<i>Case</i>	Disruption in Detroit: Ford, Silicon Valley, and Beyond (A)
<i>Suggested Readings</i>	Christensen, C. M., & Overdorf, M. (2000). Meeting the challenge of disruptive change. <i>Harvard business review</i> , 78(2), 66-77.
<i>Extra optional readings</i>	<ul style="list-style-type: none"> • Foster, “The S-Curve: A New Forecasting Tool,” <i>The Attacker’s Advantage</i> • Tushman & Anderson, “Technological Discontinuities and Organizational Environments”, <i>Administrative Science Quarterly</i>
<i>Case Question</i>	Case questions are provided at the end of the case. Contemplate all the questions, and focus more on Questions (1-3).
Week 4: 9 Feb	CNY Break, No Class

Week 5: 16 Feb	Profiting from Technology: Protecting Innovation
<i>Case</i>	The LEGO Group: Publish or Protect?
<i>Suggested Readings</i>	<ul style="list-style-type: none"> • Teece, D. J. “Profiting from technological innovation: Implications for integration, collaboration, licensing and public policy,” <i>Research Policy</i> • Besen & Raskind, “An Introduction to the Law and Economics of Intellectual Property,” <i>Journal of Economic Perspectives</i>
<i>Suggested Videos</i>	<p>These three YouTube videos will provide useful background for the case:</p> <p>Introduction to the Patent System: https://www.youtube.com/watch?v=vZ1SBP8ul1s</p> <p>Plastic Injection Molding: https://www.youtube.com/watch?v=RMjtmsr3CqA</p> <p>Shaping the future of die and moulds: EOS tooling applications: https://www.youtube.com/watch?v=zqWOrwBzOjU</p>
<i>Case Question</i>	<p>Read the case, watch the videos then contemplate these questions:</p> <ol style="list-style-type: none"> 1. How much know-how should LEGO Group share with its tool suppliers? How practical is it in reality to prevent spillovers? 2. How much of LEGO Groups’ process innovations are actually detectable? In other words, when looking at the product, do you think you would be able to see how they made it? 3. What is your recommendation about what to do about how they should drive their moulding platform and protect it?
Week 6: 23 Feb	Standards and Design Dominance
<i>Case</i>	DropBox, It Just Works
<i>Suggested Readings</i>	<ul style="list-style-type: none"> • Schilling, M. A., “Technological Leapfrogging: Lessons from the U.S. Video Game Industry”, <i>California Management Review</i> • Schilling, M. A., “Standards Battles and Design Dominance,” <i>Chapter 4 in Strategic Management of Technological Innovation</i>
<i>Case Question</i>	<ol style="list-style-type: none"> 1. Dropbox is a late mover in a crowded space. What opportunity did Houston see? 2. What are the key elements of Dropbox’s current business model? 3. Is Dropbox profitable as of June 2010? Are you optimistic about its prospects? How does your estimate of Dropbox’s current profitability influence your evaluation of the venture’s prospects?
READING WEEK	
Week 7: 8 Mar	Exam week, No Class, work on Group Project
Week 8: 15 Mar	Crossing the Chasm – Simulation
<i>Case</i>	Innovation Marketing Simulation: Crossing the Chasm, Michael Eckhardt; Mark Cavender; Geoffrey Moore; Tripat Gill, <i>HBS Case Series</i>

<i>Suggested Readings</i>	<ul style="list-style-type: none"> • D.Baker, David and C.Said, “How the Bay Area took over the Self-Driving Car Business”, <i>San Francisco Chronicle</i>, July 2017 • T.Keeney, “Mobility-As-A-Service: Why Self-Driving Cars Could Change Everything,” <i>ARK Invest Report, Research White Paper</i>, October 2017 • R.Lanctot, “Accelerating the Future: The Economic Impact of the Emerging Passenger Economy”, <i>Strategy Analytics Report</i>, June 2017
<i>Case Question</i>	You will be playing a simulation about self-driving technology. You will assume the role as an entrepreneur/manager in charge of launching and commercialising this new technology in the market.
Week 9: 22 Mar	Reinvention in the face of Technology
<i>Case</i>	The Reinvention of Kodak
<i>Suggested Readings</i>	<ul style="list-style-type: none"> • Melissa A. Schilling, “Chapter 5: Timing of Entry” in <i>Strategic Management of Technological Innovation</i>, 5th ed. • Cohen and Levinthal, Absorptive Capacity, A New Perspective, <i>Administrative Science Quarterly</i>
<i>Case Question</i>	<p>On 3 September 2021, Kodak announced it had emerged from Chapter 11 bankruptcy. Six months later, Kodak’s board announced that former Silicon Valley executive Jeff Clarke would become the company’s next CEO and charged him with leading one of the most complex corporate turnarounds in recent history. Consider the following questions as you review the case:</p> <ol style="list-style-type: none"> 1. How did Kodak go from being a giant in the film industry to facing bankruptcy? 2. What are the leadership challenges facing Clarke as he attempts to bring Kodak out of bankruptcy? 3. What trade-offs does Clarke face? Be specific. 4. What is the biggest mistake he could make as Kodak’s newly appointed CEO?
Week 10: 29 Mar	GOOD FRIDAY HOLIDAY
Week 11: 5 Apr	Course Review and Another Case Discussion (to be decided)
Week 12: 12 Apr	Final Presentations – Part 1
Week 13: 19 Apr	Final Presentations – Part 2