

## COURSE OUTLINE

**Course Code:** BSN3701A

**Course Title:** Technological Innovation

**Semester:** Semester 2, Academic Year 2023-24

**Faculty:** Su-Ann Nair

**Department:** Strategy & Policy

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### COURSE OVERVIEW

This course aims to equip students with a solid conceptual foundation to understand 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. Students will be exposed to the challenges in technological innovation, including formulating innovation strategy, coordinating collaboration, protecting innovation, and managing teams.

This course has its foundations in theory and research but is practice-oriented. This means that students will uncover challenges in technological innovation through case studies of real world companies that seek to build strong market positions for their innovations; firms with successful (and unsuccessful) technology strategies; companies that must formulate strategy in rapidly changing and highly uncertain market contexts; and enterprises whose market positions are challenged by external technological developments.

The course develops frameworks for analysing strategic issues faced 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.

#### ***Who should take this course?***

This course is designed for undergraduate students, to be taken as part of the Minor in Technopreneurship program offered by the NUS Business School. There are no formal prerequisites for this course.

### COURSE MATERIALS

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

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

## ASSESSMENT

Attendance: 10%

Class participation: 30%

Group Project: 40%

- Final Group Presentation: 20%
- Group report: 20%

Individual Case Analysis: 20%

### **Attendance (10%):**

Missing class will affect your grade and more importantly your own and your classmates' experience in the class. Attendance will be recorded every week after the first class. Absences will only be excused for valid reasons such as being certified medically unfit by a doctor, experiencing a death in the immediate family, or being involved in a serious accident. If you are absent for a valid reason, please email me and your class TA, Bryan Chai ([bryanchai@u.nus.edu](mailto:bryanchai@u.nus.edu)), and provide documentary evidence in the subsequent class.

*Failure to attend class will result in a zero class participation score for that class.*

### **Class Participation (30%):**

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). Comments should be thoughtful and constructive. 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. **Expect to be cold called.**

### **Group Work - Company Assessment (40%):**

In a group with *at least* 6 members, perform an in-depth analysis of a company's technology strategy and the positioning of its products or services. The paper may be up to 20 pages in length (*1 inch margins, double spaced and 12 point font*), including figures, financials, and other exhibits. I highly recommend 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 present the results of their research to the class.

Your paper should describe the firm's technology strategy and the key strategic issues that face the organisation. Although not all of the following issues will be relevant to the situation you choose to analyse, 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 analysing, your target's intellectual property position, its key competencies, the stage of development of its products, 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.

### **Suggestions for Making Effective Presentations**

Making effective presentations is an essential life skill. Quality presentations should be insightful, focused, fun, and within the time limit. A few suggestions include:

- 1) Practise and rehearse your presentation in advance. This will make a big difference.
- 2) Refrain from reading off your notes or slides. Try to speak to the audience.
- 3) Be efficient, get to the key points quickly and clearly and stay within the time limit.

### **Final - Individual Written Case Analysis (20%):**

Each person is responsible for writing up a case analysis (*10 pages maximum, 1 inch margins, double spaced and 12 point font*). This write-up will be based on a case that I will distribute in the last week of class, and will be due one week after. You are free to discuss and work with groups of any size, however all final submissions should be prepared independently. If you choose to work in groups, acknowledge all group members involved in the case discussion.

Some guidelines and expectations:

- This is NOT a 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. Case facts are used as evidence and not as arguments; aim not to regurgitate case facts, but rather reveal lessons
- Focus. Aim for depth rather than breadth.
- Buzzwords are not arguments. If you use buzzwords/concepts, make sure you elaborate and explain how they are relevant.
- Write in *prose*; I expect an essay. Articulate the main points clearly using topic sentences and make sure the writing and argumentation flows logically.

## **CLASS ADMINISTRATION**

### **Ground Rules**

- Please display your **name card**. If you forget your name card, please make a temporary name card for that session
- Please silence your cell-phone before each course session
- We have a **no personal device screen policy** for the class (i.e., no phones or

laptops). As the class is mostly case-based, we ask that you be respectful to your fellow students during case discussions

### **Missed Class Sessions**

As noted above, attendance will be recorded every week after the first class and absences will only be excused for valid reasons. If you are absent, please email me and the TA before class and provide documentary evidence by the subsequent class.

### **Assignments**

Please note that **LATE SUBMISSIONS WILL NOT BE GRADED** and that **SEVERE PENALTIES EXIST FOR PLAGIARISM**. If you have any questions regarding these policies please ask me in advance of potential issues. I will be available during the course, appointments, and via email.

### **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 doubts, please consult me.

Additional guidance is available at:

<https://studentconduct.nus.edu.sg/wp-content/uploads/2022/01/NUS-Code-of-Student-Conduct.pdf>

**COURSE SCHEDULE** (subject to change)

<b>Week 1: 15 Jan 2024</b>	<b>No Class</b>
<b>Week 2: 22 Jan 2024</b>	<b>Course Overview and Introduction</b>
<i>Case</i>	EMI and the CT Scanner (A), Bartlett C. A., <i>HBS Case Series</i>
<i>Suggested Readings</i>	C.Christensen, M.Raynor, and R.McDonald "What is Disruptive Innovation?", <i>Harvard Business Review</i> 90, no. 12 (2015): 44-53 J.Gans, "The Other Disruption", <i>Harvard Business Review</i> 94, no. 3 (2016): 78-85
<i>Case Questions</i>	After reading the (A) case, think about these questions: <ol style="list-style-type: none"> <li>1. What predictions can you make about industry and competitive developments as of 1972?</li> <li>2. Should EMI enter the CT scanner business? Why or why not?</li> <li>3. How attractive is this business?</li> <li>4. Who will make the money in CT scanners and why?</li> </ol>
<b>Week 3: 29 Jan 2024</b>	<b>Organisation in Innovation</b>
<b><i>Due</i></b>	<b><i>Submit your project teams - Minimum groups of 6</i></b>
<i>Case</i>	EMI and the CT Scanner (B), Bartlett C. A., <i>HBS Case Series</i>
<i>Suggested Readings</i>	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 Questions</i>	After reading the (B) case, think about these questions: <ol style="list-style-type: none"> <li>1. How was EMI doing in the CT business in 1976?</li> <li>2. How do you assess the company's performance to date?</li> <li>3. What should Powell do at the conclusion of the case?</li> </ol>
<b>Week 4: 5 Feb 2024</b>	<b>Profiting from Technology: Protecting Innovation</b>
<i>Case</i>	The LEGO Group: Publish or Protect? HBS Case Series
<i>Suggested Readings</i>	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> These three YouTube videos will provide useful background for the case: <b><i>Introduction to the Patent System:</i></b> <a href="https://www.youtube.com/watch?v=vZ1SBP8ul1s">https://www.youtube.com/watch?v=vZ1SBP8ul1s</a> <b><i>Plastic Injection Molding:</i></b> <a href="https://www.youtube.com/watch?v=RMjtmsr3CqA">https://www.youtube.com/watch?v=RMjtmsr3CqA</a> <b><i>Shaping the future of die and moulds: EOS tooling applications:</i></b> <a href="https://www.youtube.com/watch?v=zqWOrwBzOjU">https://www.youtube.com/watch?v=zqWOrwBzOjU</a>

<i>Case Questions</i>	<ol style="list-style-type: none"> <li>1. How much know-how should LEGO Group share with its tool suppliers? How practical is it in reality to prevent spillovers?</li> <li>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?</li> <li>3. What is your recommendation about what to do about how they should drive their moulding platform and protect it?</li> </ol>
<b>Week 5: 12 Feb 2024</b>	<b>CNY Break, No Class</b>
<b>Week 6: 19 Feb 2024</b>	<b>Standards and Design Dominance</b>
<i>Case</i>	"DropBox, It Just Works", Eisenmann, Pao and Barley, <i>HBS Case Series</i>
<i>Suggested Readings</i>	<p>Schilling, M. A., "Technological Leapfrogging: Lessons from the U.S. Video Game Industry", <i>California Management Review</i></p> <p>Schilling, M. A., "Standards Battles and Design Dominance," <i>Chapter 4 in Strategic Management of Technological Innovation</i></p> <p>M.Alstyne, G.Parker, S.Choudary, "Pipelines, Platforms, and the New Rules of Strategy", <i>Harvard Business Review 94, no. 4 (2016): 54-62</i></p>
<i>Case Questions</i>	<ol style="list-style-type: none"> <li>1. Dropbox is a late mover in a crowded space. What opportunity did Houston see?</li> <li>2. What are the key elements of Dropbox's current business model?</li> <li>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?</li> </ol>
<b><i>Recess Week</i></b>	
<b>Week 7: 4 Mar 2024</b>	<b>Exam Week, No Class; Work on Group Project</b>
<b>Week 8: 11 Mar 2024</b>	<b>Dealing with Disruptive Change in the Cloud</b>
<i>Case</i>	General Management Simulation: CloudStrat, Managing Migration to the Cloud, Mohanbir Sawhney; Michael Bean, Kellogg School of Management
<i>Suggested Readings</i>	<p>Intro to Cloud Strat (video)</p> <p>CloudStrat: Managing Migration to the Cloud</p>
<i>Case Questions</i>	You will assume the role as the Chief Strategy Officer of Legasoft, the global market leader in the Enterprise Resource Planning (ERP) software industry. You will be allowed to play two practice runs before the actual evaluated gameplay. More instructions will be given closer to date.
<b>Week 9: 18 Mar 2024</b>	<b>Crossing the Chasm - Simulation</b>
<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>	D.Baker, David and C.Said, "How the Bay Area took over the Self-Driving Car Business", <i>San Francisco Chronicle, July 2017</i>

	<p>T.Keeney, “Mobility-As-A-Service: Why Self-Driving Cars Could Change Everything,” <i>ARK Invest Report, Research White Paper, October 2017</i></p> <p>R.Lanctot, “Accelerating the Future: The Economic Impact of the Emerging Passenger Economy”, <i>Strategy Analytics Report, June 2017</i></p>
<i>Case Questions</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.
<b>Week 10: 25 Mar 2024</b>	<b>Reinvention in the face of Technology</b>
<i>Case</i>	The Reinvention of Kodak, Ryan L. Raffaelli; Christine Snively, <i>HBS Case Series</i>
<i>Suggested Readings</i>	<p>Melissa A. Schilling, “Chapter 5: Timing of Entry” in <i>Strategic Management of Technological Innovation, 5th ed.</i></p> <p>Cohen and Levinthal, Absorptive Capacity, A New Perspective, <i>Administrative Science Quarterly</i></p>
<i>Case Questions</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"> <li>1. How did Kodak go from being a giant in the film industry to facing bankruptcy?</li> <li>2. What are the leadership challenges facing Clarke as he attempts to bring Kodak out of bankruptcy?</li> <li>3. What trade-offs does Clarke face? Be specific.</li> <li>4. What is the biggest mistake he could make as Kodak’s newly appointed CEO?</li> </ol>
<b>Week 11: 1 Apr 2024</b>	<p><b>Final Project Presentations - Part 1</b></p> <p><i>Note: Order of group presentations will be chosen randomly</i></p>
<b>Week 12: 8 Apr 2024</b>	<p><b>Final Project Presentations - Part 2</b></p> <p><i>Note: Order of group presentations will be chosen randomly</i></p>
<b>Week 13: 15 Apr 2024</b>	<p><b>Course Wrap-Up and Review</b></p> <p><b>Final Individual Written Case Analysis due on <u>17 Apr 2024 at 5p.m</u></b></p> <p><b>Final Group Project Report due on <u>19 Apr 2024 at 5p.m</u></b></p>