



SI845: Technology Strategy

Fall 2022

Instructor: Timothy Simcoe (tsimcoe@bu.edu)
Office Hours: Mondays 4-5PM

Course Overview

Technology Strategy is an advanced graduate course that teaches a series of concepts, frameworks, and tools for analyzing and managing businesses in an environment with rapid technological change. This course is complementary to both a core class in Competitive Strategy and other functional electives. It should be particularly valuable for students who work in technology-based firms and industries, as well as those seeking to better understand how growth and wealth are created through technological innovation in a modern economy.

Technology Strategy provides a comprehensive review of the key theories and tools needed to understand: (a) how technological change creates new markets and prompts new business models; (b) how technology-based firms compete with rivals in fast-growing markets characterized by high uncertainty; (c) how firms assemble the resources required to commercialize an innovative technology; and (d) how the evolution of technology affects the type of firm capabilities needed to succeed in an industry over time.

In addition to being conceptually rigorous, the course is designed to be very “hands-on” and “experiential” in several ways. The case method will be used throughout the semester, and students will also present “live cases” that link current events to class concepts. We will use online simulations of management decision-making and hear from several guest speakers.

After taking this course, students will have a solid understanding of:

- How innovation emerges and how industries are born or disrupted through technological change.
- How technology-based companies make strategic decisions to identify and exploit market opportunities.
- How factors beyond the control of a single firm, such as competition in complementary markets or the organization of the broader technology-developing community, can influence the chances of success of competing technologies.

Specific topics to be covered include:

- Sources of Technological Innovation
- Technology Diffusion / Crossing the Chasm
- Disruptive Innovation / Technology S-curves
- Industry evolution / Dominant Designs
- Dynamics of Industry Platforms / Platform Strategies

- Learning from failures as technology and market needs evolve.
- Appropriability Mechanisms: Intellectual Property, Lead Times, Secrecy, Copyright
- Complementary Assets: Sales & Distribution, Key inputs, Related Technology
- Industry Standards / Regulatory Environment
- Technology Transfer and Commercialization

What is Expected of Students

Prerequisites: Introductory “Core” Strategy (SI 751 or equivalent) or permission of instructor.

Attendance and Participation: Students are allowed to miss one class session “for free.” If you not able to attend a second class session, please try to let me know in advance. Although I will make reasonable accommodations for emergent health, family or work-related situations, repeat absence will generally impact a student’s grade for the semester.

For participation, my baseline expectation is that students will prepare all readings and materials in advance; engage actively in class discussion; and submit all assignments on their due date before the start of class.

Readings: The course pack will consist of articles, cases, and videos on issues related to business and technology. These readings will provide conceptual frameworks and specific industry and firm examples for the discussions and analyses in class. Additional readings might be added during the course of the semester to accommodate ideas generated during class discussions.

Class Contributions. Students are expected to prepare for every class, including the introductory lecture. To prepare for class discussion, students should summarize the problem or topic covered in each article, outline the article’s core points and recommendations, and assess the strengths / weaknesses of the readings’ central argument. To prepare for cases, students should pay attention to the main story and the details, think about the factors that contributed to the existing situation, and about the course of action they would recommend and why. Participation is graded and constitutes an important part of the class experience. Still, students are reminded that they should use airtime judiciously and build upon the existing discussion whenever possible.

Professional Conduct: Instructors and students should conduct themselves in a professional manner during all in-person and online class activities. This includes treating one another with courtesy and respect in all written and verbal communications, adhering to pre-agreed commitments, and providing adequate notice in the event that you cannot attend a class or scheduled meeting. It also includes presenting yourself professionally. While there is no dress code or formal policy with respect to online meeting etiquette, participants should seek an appropriate location (i.e. at a desk and, to the extent possible, free of distractions) and should dress as they would for any business meeting.

Class Policies

Diversity and Inclusion: In developing this course, I have aimed to be thoughtful about how identity and culture impact the course content. I invite you to share your personal experiences and perspective related to the course content. If there are topics or conversations that you feel would benefit from incorporation of social context, a differing perspective, or Questrom’s Office of Diversity & Inclusion, please inform me and I will explore resources and opportunities for us to engage a wide variety of perspectives in our classroom.

Academic Accommodations for students with special needs: In keeping with University policy, any student with a disability who needs or thinks they need academic accommodations must call the Office of Disability Services

at 353-3658 or stop by 19 Deerfield Street to arrange a confidential appointment with a Disability Services staff member. Accommodation letters must be delivered to the instructor in a timely fashion (within two weeks of the date on the letter and not later than two weeks before any major examination). Please note that accommodations will not be delivered absent an official letter for that purpose.

Sexual Misconduct / Title IX Policy: The Questrom School of Business is committed to fostering a safe learning environment for all members of the its community and preventing sexual misconduct. All forms of sexual misconduct, including rape, acquaintance rape, sexual assault, domestic and dating violence, stalking, and sexual harassment are violations of Boston University’s policies, whether they happen on campus or off campus. Title IX of the Education Amendments of 1972 is a federal civil rights law that prohibits sex-based discrimination in federally funded education programs and activities. This law makes it clear that violence and harassment based on sex and gender is a Civil Rights offense subject to the same kinds of accountability and the same kinds of support applied to offenses against other protected categories such as race, national origin, etc. If you or someone you know has been harassed or assaulted, you can find the appropriate resources at <http://www.bu.edu/safety/sexual-misconduct/>.

Assignments and Evaluation

The final grade of the course will have four components:

Component	Type	Weight
Contribution to Learning Environment	Individual	25%
Case analysis write-ups	Individual	15% x 2
“Live case” presentation	Individual	15%
Final Project	Team	30%

Questrom School of Business follows school-wide voluntary guidelines for MBA elective courses that are graded: specifically, no more than 50% of grades should be in the A or A- range. I will not, however, “inflate” or “deflate” any of your grades. The final grades will be based upon a mathematical calculation that reflects the weights listed above.

If you have any questions about grades that you receive on particular assignments, you must raise them within two weeks of receiving your grade on that assignment. Unless I have made a computational error, I will not alter any assessments after final grades have been determined. If you have particular grade-related considerations that you think are important, please raise those questions as soon as possible, so that I can help you approach the course in a way that will help you achieve your best possible performance.

Contribution to Learning Environment (Individual)

- Please see preceding section “What is Expected of Students.” Please note that all contributions to class discussion will be taken into account, including questions to guest speakers and other students.
- Case discussions will follow the Socratic method, and you should arrive at every class prepared to answer a “cold call” from the instructor on your analysis of the assigned material. Assessment of participation is based primarily on your active involvement in class discussion, and may include contributions such as: providing germane illustrations; providing motivation for a tool or technique; helpful recapitulation or summarizing; making observations that link or integrate concepts or discussion; responding effectively to questions; asking perceptive questions; presenting or supporting alternative, or unpopular, positions.
- Class discussions will be conducted by the norms of a professional business meeting: you are expected to arrive on time and to comply with the scheduling of class breaks. In particular you are expected to

treat colleagues with respect: to disagree with an idea without discrediting the speaker; to help others to articulate their points of view; and to use airtime judiciously. Students who persistently attempt to dominate discussion, discourage or intimidate other participants, or otherwise diminish the value of the class, will be penalized.

- Assessment of participation will have three components: (i) Attendance and sufficient preparation to answer factual queries; (ii) the instructor's assessment of your contributions to class-discussion; (iii) your peer's assessment of your contribution to their in-class learning. (The process for collecting student input for participation grades will be explained in detail in class.) Around the mid-point in the course, all students will receive feedback from the instructor on their standing with regard to class participation.

Case write-ups (Individual)

- There will be a case discussion in most class sessions. All students are responsible for reading the case and preparing for discussion. To help you prepare, I will post a list of discussion questions. Every student will be randomly assigned **two** cases, and for those cases you should prepare a 2-page (maximum) memo that answers the questions shown in *italics* for that week. I will be looking for a clear answer to each question, along with supporting analysis that draws on the facts of the case. Do not copy and paste your answers from the case, unless you feel a direct quotation supports your argument.

Live Cases (Individual)

- You will be asked to submit a short slide deck (up to five powerpoint slides) containing a value-added analysis of a "live" example of a company or industry illustrating the **previous session's** topic and concepts. Each of you will be randomly assigned a specific session to cover, and a date to give your 5 minute presentation of these slides to the class. You should post your slides before the start of the next class session when you are presenting. A "live" example is something taken from your reading of the media or your personal experience (within the past few weeks), and your presentation should feature some analysis/evaluation of the issue as well as reportage, with clear links to the relevant class session's material.

Final Research Project (Teams)

- During the first class session, I will provide a set of potential topics for the team project. These topics will focus on a new venture (i.e. a start-up company, or a new product initiative within an existing company) in a particular technology space. I will also identify a strategic choice facing the new venture. Your job will be to research the technology and/or company and formulate a recommendation based on your own research along with the concepts discussed in class.
- The final written deliverable will be a memo summarizing your analysis and recommendation. Guidelines on length and format will be provided in class.
- Teams should have 4 or 5 members. You may select your own teammates, but I retain the right to merge, divide or reassign team members in order to achieve a reasonable balance across the entire class. There will be a team grade, but individual grades may diverge from this team grade by up to one letter grade (up or down), depending on individual contributions. Individual contributions will be assessed via an intra-team individual evaluation form that students will have to fill out.

Semester Overview

	Date	Topic	Case	Readings
1	Sep-7	Introduction		Bloom et al; Fleming; Basker & Simcoe; Hype cycle
2	Sep-14	Diffusion		Gawande; Linowes; Cockburn, Lanjouw & Schankerman; NPR
3	Sep-21	Industry Life Cycle	Nokia	Simcoe; Bower & Christensen; Gates.
4	Sep-28	Disruption	Britannica	King & Baatartogtokh; NUMMI; FTC complaint.
5	Oct-5	R&D Management	Vertex	Wheelwright and Clark; Hounshell
6	Oct-12	Simulation Week	Back Bay Battery	Planet Money; Copyright, Trademark & patents article.
7	Oct-19	Intellectual Property	Qualcomm ARM Holdings	
8	Oct-26	Experimentation	Flagship	Gans & Stern
9	Nov-2	Markets for Technology	Millenium	Teece; Flash of Genius
10	Nov-9	Platform Dynamics	USGBC	Eisenmann, Parker & Van Alstyne
11	Nov-16	Co-opetition	GREE	Yoffie & Kwak; App Store commissions article
	Nov-23	Thanksgiving Holiday		
12	Nov-30	Industry Standards	Atheros	Shapiro & Varian; Farrell & Simcoe; Planet Money
13	Dec-7	Technology Policy	Comcast-NetFlix	
	Dec-14	Due Date for Written Part of Final Project		

READINGS & CLASS PREPARATION DETAILS

Readings marked with a "*" are contained in the course reader.

Session 1: Introduction

- Bloom, N., J. Van Reenen and H. Williams, "A Toolkit of Policies to Promote Innovation" Journal of Economic Perspectives, Summer 2019.
- *"Breakthroughs and the Long Tail of Innovation" Lee Fleming, Sloan Management Review, 2007.
- Wikipedia Page on the "Gartner Hype Cycle" : https://en.wikipedia.org/wiki/Hype_cycle
- Basker, E. and T. Simcoe, "Upstream Downstream: Diffusion and Impacts of the UPC Code." <http://www.nber.org/papers/w24040>. (Skim. Don't worry about technical detail!)

Session 2: Diffusion

- Gawande, A. "Slow Ideas", *The New Yorker*, July 29, 2013.
- Cockburn, I., J. Lanjouw and M. Schankerman "Patents and the Global Diffusion of New Drugs" American Economic Review, 106(1):136-164, 2016.
- Linowes, J.S. "A Summary of 'Crossing the Chasm'" Parker Hill Technology.
- Listen to NPR Planet Money Episode #630 "Free Parking"

Session 3: Industry Life Cycles

- Case: Nokia: The Burning Platform (BU iBooks case available from amazon.com)
- Class Note: Business Stealing and Replacement Effects
- *Bower and Christensen, "Disruptive Technologies: Catching the Wave", *Harvard Business Review*, 1995.
- Gates, W. "The Internet Tidal Wave" Microsoft Internal Memo (1995).

Session 4: Disruption

- *Case: The Crisis at Encyclopaedia Britannica (KEL251)
- *King, A. and Baatartogtokh, B. "How Useful is the Theory of Disruptive Innovation?" MIT Sloan Management Review, Fall 2015.
- Listen to NPR This American Life Episode #403 "NUMMI"
- Federal Trade Commission vs. Facebook, Inc. "Complaint for Injunctive and Other Equitable Relief" (skim)

Session 5: R&D Management

- *Case: Vertex Pharmaceuticals: R&D Portfolio Management (A) (HBS 9-604-101)
- Hounshell, D. "The Evolution of Industrial Research in the United States" (1996) Chapter 1 from *Engines of Innovation*, Rosenberg and Spencer, eds.
- *Wheelwright, S. and K. Clark "Creating Project Plans to Focus Product Development" *Harvard Business Review* (March 1992)

Session 6: R&D Simulation

- *Back Bay Battery (detailed instructions will be provided)
- Listen to NPR Planet Money Episodes #627 "The Miracle Apple"
- Alexander Webb, "[The Difference Between Copyrights, Trademarks and Patents](#)" *New York Times*, April 16, 2020.

Session 7: Intellectual Property

- *Case: Qualcomm Incorporated 2009 (HBS 9-710-433)
- *Case: "ARM Holdings: IP Licensing to Internet of Things" (SMU526)

Session 8: Experimentation

- *Case: Institutionalized Entrepreneurship: Flagship Pioneering (HBS 9-718-484)
- Gans, J. and S. Stern, "The Product Market and the Market for Ideas: Commercialization Strategies for Technology Entrepreneurs," *Research Policy* 2002.

Session 9: Markets for Technology

- *Case: Millennium Pharmaceuticals, Inc. (HBS 9-600-033)
- Teece, D., "Capturing Value from Technological Innovation: Integration, Strategic Partnering and Licensing Decisions," *Interfaces*, 1988.
- Seabrook, John. "The Flash of Genius" *New Yorker*, 1993.

Session 10: Ecosystems & Platform Dynamics

- *Case: “Platform LEEDership at USGBC” (HBS 9-618-027)
- *Eisenmann, T., G. Parker and M. Van Alstyne, “Strategies for two-sided markets,” *Harvard Business Review*, 2006.

Session 11: Co-opetition and Complementors

- *Case: Gree, Inc. (HBS 9-713-447)
- *Yoffie, D. and M. Kwak, “With Friends Like These, The Art of Managing Complementors,” *Harvard Business Review*, September 2006.

Session 12: Industry Standards

- *Case: Atheros (HBS 9-806-093)
- Shapiro, C. and H. Varian, “The Art of Standards Wars,” *California Management Review*, 1999.
- Farrell, J. and T. Simcoe, “Four Paths to Compatibility,” chapter in *Oxford Handbook of the Digital Economy* (see instructor’s web site).
- Listen to NPR Planet Money Episode 500 “The Humble Innovation at the Heart of the Global Economy”

Session 13: Technology Policy & Conclusions

- *Case: “Streaming Over Broadband: Why Doesn’t My Netflix Work?” (HBS 9-616-007)