SI845: Technology Strategy  
Fall 2016

Instructor: Timothy Simcoe (tsimcoe@bu.edu)  
Office Hours: By appointment (HAR 641)

Course Overview
Technology Strategy is an advanced graduate class that equips students with an array of interrelated frameworks, concepts, tools and language for analyzing and managing businesses in an environment with rapid technological change. The course complements both a core strategy course and other strategy and functional electives. It should be particularly valuable for students who want to work in or start businesses in high-technology sectors, and also those who want 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 can outcompete 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. First, most of the material taught deals directly with areas in which Questrom’s Strategy & Innovation Department are active and well-known researchers; this means that we will be learning frameworks and concepts that our own faculty members have helped develop. Second, the use of hands-on exercises based on vignettes and situations of specific companies will provide students with an opportunity to apply the class concepts to specific companies and situations they can relate to. Third, we will take full advantage of “live cases” by linking short class assignments to the industries and situations faced by outside guest speakers’ companies, or companies “in the news” during the semester. By asking students to write about what they learned from linking these company’s challenges to the class concepts, students will have an opportunity to deepen their learning. Fourth, through the use of an online simulation centered on the strategic management of technology and innovation, the students will have the opportunity to be in the driving seat of a (virtual) firm – and compete against their classmates for best performance managing a technological disruption. Lastly, students are expected to extend the class discussions by posting comments or relevant links/material in the QuestromTools course forum. We will also use the forum to post proposals for final team projects and receive feedback from the rest of the class.

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 strategy decisions to identify, explore 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.

**Prepare the 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. The class is highly interactive. To prepare for the class discussion, students should summarize the problem or topic covered in the 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. Class participation is graded and is crucial to a valuable class experience. Still, students are reminded that they should use airtime judiciously and build upon the existing discussion whenever possible.

**Attendance.** Satisfactory class participation entails attendance at every session; preparation of all materials for every session; and active participation in class discussions. You may be absent once during the course; please notify the professor in advance if you have to miss a session. All subsequent absences will materially affect your final grade for the course. If a student anticipates that she will have to miss two or more sessions, then that student should let the professor know in advance and explain the reason for the absence. Assignments are always due at the beginning of class on their due date, even if you are unable to attend class that day.
Course Grading and Assignments

The final grade of the course will be composed of five components:

<table>
<thead>
<tr>
<th>Component</th>
<th>Type</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contribution to Class Discussion</td>
<td>Individual</td>
<td>25%</td>
</tr>
<tr>
<td>Burning Platform Exercise</td>
<td>Team</td>
<td>10%</td>
</tr>
<tr>
<td>“Live case” assignment</td>
<td>Individual</td>
<td>20%</td>
</tr>
<tr>
<td>Back Bay Battery Simulation Report</td>
<td>Individual</td>
<td>15%</td>
</tr>
<tr>
<td>Final Research Project</td>
<td>Team</td>
<td>30%</td>
</tr>
</tbody>
</table>

Contribution to Class Discussion (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 to other teams presenting their work.
- 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.

Burning Platform Exercise (Teams)
- Before coming to the session where this case will be discussed, students working in assigned teams will prepare a report analyzing the strategic options open to Nokia in early 2011. The team should discuss the advantages and disadvantages of each option, and then come up with a recommendation to Mr. Elop. Specific instructions and a worksheet for analysis will be given out before the in-class exercise. Limit: 2,000 words.

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 on Questom Tools 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.

Back Bay Battery Simulation Report (Individual)

• In the middle of the semester, students will have the opportunity to experiment hand-on with what it is to manage a technology firm, through the Back Bay Battery simulation. Specific instructions for the simulation will be posted in the Questrom Tools course site. The simulation is run individually, during class time. After the simulation is done, each student should prepare a 1,000 words (max) report with a summary table of her/his simulation runs and an analysis of what she/he learned from running the simulation. Students should make sure to use some of the frameworks and insights from class when writing their report.

Final Research Project (Teams)

• Each team will focus on one technology market and one new venture (a start-up company, or a product initiative by an existing company) in that space. Using the concepts discussed in class, the students should hand out, in the last session of the course, a report on their analysis of the current strategic position of the venture, and recommendations of what the firm should do next.

• In order to receive feedback for their project, the teams will have time to discuss their selected technology market and venture during Session #8. Teams are asked to justify their selection: What makes this technology market interesting for a project? Why focus on this particular start-up? Teams are expected to incorporate the feedback they receive from the professor and the students into their work and final project report and presentation.

• During the last two sessions, teams will present their final projects. It is not necessary for all team members to present, but everybody should be upfront to answer questions after the presentation.

• There will be a team grade, but individual grades may divert from this team grade in up to one letter grade up or down, depending on the individual contribution to the team. Individual contributions will be assessed via an intra-team individual evaluation form that students will have to fill out.

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.
### Semester Overview

<table>
<thead>
<tr>
<th>Date</th>
<th>Topic</th>
<th>Case</th>
<th>Readings</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Sep-7</td>
<td>Introduction</td>
<td>Cree, Inc.</td>
<td>Baumol; Scherer</td>
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<tr>
<td>2 Sep-14</td>
<td>Diffusion</td>
<td>Performance Indicator</td>
<td>Gawande; Griliches; Audio</td>
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<td>3 Sep-21</td>
<td>Disruption</td>
<td>Britannica</td>
<td>Bower &amp; Christensen; King &amp; Baatartogtokh; Audio.</td>
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<tr>
<td>4 Sep-28</td>
<td>Industry Life Cycle</td>
<td>Nokia</td>
<td>Foster; Simcoe; Uterback &amp; Suarez; Gates</td>
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<td>5 Oct-5</td>
<td>R&amp;D Management</td>
<td>Back Bay Battery</td>
<td>Wheelwright &amp; Clark; Spector et al.</td>
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<tr>
<td>6 Oct-12</td>
<td>Intellectual Property</td>
<td>Qualcomm</td>
<td>Shapiro; Planet Money; uBeam posts</td>
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<td>7 Oct-19</td>
<td>Value Chain</td>
<td>A123</td>
<td>Teece</td>
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<td>8 Oct-26</td>
<td>Product &amp; Idea Markets</td>
<td>Millenium</td>
<td>Gans &amp; Stern; Simcoe YouTube</td>
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<td>9 Nov-2</td>
<td>Platform Dynamics</td>
<td>LEED</td>
<td>Eisenmann et al.; Shapiro &amp; Varian</td>
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<tr>
<td>10 Nov-9</td>
<td>Co-opetition</td>
<td>GREE</td>
<td>Yoffie &amp; Kwak; Brandenburger &amp; Nalebuff</td>
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<td>11 Nov-16</td>
<td>Industry Standards</td>
<td>Atheros</td>
<td>Farrell &amp; Simcoe; Planet Money</td>
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<tr>
<td>12 Nov-30</td>
<td>Tech Policy</td>
<td>Streaming Video</td>
<td>Greenstein et al.; Online readings (TBD)</td>
</tr>
<tr>
<td>13 Dec-7</td>
<td>Conclusions*</td>
<td>CEA; Mowery &amp; Simcoe; Porter &amp; Stern; Romer; Atkinson</td>
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#### Thanksgiving Holiday

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### READINGS & CLASS PREPARATION DETAILS

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

**Session 1: Introduction**

- Case: “Cree, Inc.: Which Bright Future?” (HBS 9-711-457)

**Session 2: Diffusion**

- Case: Performance Indicator (HBS 9-702-480)
- Wikipedia pages on “Diffusion of Innovations” and “Crossing the Chasm”
  https://en.wikipedia.org/wiki/Crossing_the_Chasm
- Listen to NPR Planet Money Episode #630 "Free Parking"

**Session 3: Disruption**

• *Case: The Crisis at Encyclopaedia Britannica (KEL251)*
• Listen to NPR This American Life Episode #403 “NUMMI”

**Session 4: Industry Life Cycle**

• Case: Nokia: The Burning Platform (BU iBooks case available from amazon.com)
• Class Note: Business Stealing and Replacement Effects
• (Optional): Utterback, J. “Invasion of a Stable Business by Radical Innovation: the Natural Ice Industry.”

**Session 5: R&D Management**

• *Back Bay Battery* (detailed instructions will be provided)

**Session 6: Intellectual Property**

• *Case: Qualcomm Incorporated 2009 (HBS 9-710-433)*
• Listen to NPR Planet Money Episode #399 “Meat Patents”
• Web posts on uBeam:
  o https://techcrunch.com/2015/04/26/kill-the-cord/
  o https://techcrunch.com/2016/05/11/charged/
  o Find at least 1 uBeam patent at the USPTO web site and read it

**Session 7: Value Chain Strategy**
• *Case: A123 Systems Powering a Sustainable Future: Strategizing in the Advanced Battery Market (Univ. of Michigan ERB Institute, Case W93C02)

**Session 8: Product vs. Idea Markets**

• *Case: Millennium Pharmaceuticals, Inc. (HBS 9-600-033)
• Watch Streaming Lecture on YouTube

**Session 9: Platform Dynamics**

• Case: “Building LEED” (Materials to be supplied by instructor)

**Session 10: Co-opetition**

• *Case: Gree, Inc. (HBS 9-713-447)
• http://www.wired.com/2013/02/facebook-the-winner-in-the-platform-hunger-games/

**Session 11: Industry Standards**

• *Case: Atheros (HBS 9-806-093)
• Listen to NPR Planet Money Episode 500 "The Humble Innovation at the Heart of the Global Economy"

**Session 12: Technology Policy**

• *Case: “Streaming Over Broadband: Why Doesn’t My Netflix Work?” (HBS 9-616-007)
• FCC Open Internet web site.
• Comcast Open Internet web site.
• “Do the FDA’s Regulation Governing Medical Devices Need to be Overhauled?” Wall Street Journal online, March 13, 2015. (online)
Session 13: Conclusions

- Mowery and Simcoe “Was the Internet a US Invention?” Research Policy