Technology Strategy

Professor: Cesare Righi
Office hours: by appointment
Course Type: Elective
Credits: 30 hours
Term: Spring

Course Description

In many industries, technological change is fundamental to build and sustain firms' competitive advantage. This course teaches key concepts and frameworks for analyzing and managing companies in environments where technological change can transform markets, and create opportunities and threats for start-ups and established companies. Using a combination of lectures and business case discussions, the course focuses on understanding how technological change creates new markets, prompts new business models, or disrupts industries; how companies make decisions to identify market opportunities and assemble the resources required for commercializing their innovations; and how factors that may be beyond a company's control, such external trends in technology evolution, competition in complementary markets, or broader technology-developing communities, affect a firm's technology development and success.

Objectives

Understand the nature of strategic competitiveness and develop the ability to analyze the competitive environment facing a firm, assess the attractiveness of the industry and identify potential sources of competitive advantage.

Recognize typical technical, organizational, and market issues that occur during the product life cycle, and be better equipped to anticipate and manage such problems.

Consider the actions of competitors and how that impacts the ability of a business to accomplish its strategic goals. Develop courses of actions that incorporate the actions of multiple players in the marketplace.

Discriminate among the types of data that general managers need to evaluate alternative scenarios. Make quantitative assessments of strategic alternatives and develop logical, coherent and persuasive analyses for a desired course of action.

Methodology

This course exploits four complementary approaches to reach the objective highlighted above: individual class contribution, team project presentation, individual case reports, and an individual in-class final exam.

Individual class contribution

Active participation in the class is an essential part of the learning experience. We will be using cases as well as other readings and the students must be prepared to discuss everything assigned for each session. Assessment of class contributions is based on the active involvement of the student in discussions during lectures and business case discussions. It reflects primarily the quality (and secondarily the quantity) of the contributions to the classroom environment and to the learning of all participants. Positive contributions may include (but are not limited to): helpful recapitulation or summarizing of theories and concepts discussed in class; making observations that link or integrate concepts or discussion; asking interesting questions; responding effectively to questions; using personal knowledge and experiences to illustrate or clarify specific points; presenting or supporting alternative positions. Being “wrong” will not count against the student, but it will not help out. Making empty or repetitive comments that do not add to the discussion will not help, and may hurt if these comments interfere with the ability to discuss issues in depth. Students who discourage, intimidate, or show a lack of respect for other participants, or diminish the value of the class in any way, will be penalized. In particular, students are expected to treat colleagues with respect.

Team project

The Technology Strategy Team Project asks the student to participate in a consulting project team. Each team will analyze a company to understand the key strategic challenge facing the company and to make recommendations on how the company can improve its technology strategy. The analysis will be based on the concepts we study in class, and on the team's research and analysis of the company. Each team must present their analysis to the class. All members of a team must present part of the presentation. The instructor will judge the presentation on the quality of the analysis (i.e., the application of course frameworks, the team's research on the company, and the evidence used to support specific arguments), on the soundness of the business logic by which it identifies key issues and proposes solutions that draw on course frameworks, and on the effectiveness with which the presentation communicates that analysis (e.g. clarity, slide quality). The instructor will provide details on the team projects during the course.

Individual case reports

There will be a case discussion for each topic. All students must read the case before class and be prepared for the discussion. To help the students prepare, the instructor will provide a list of discussion questions. For each case, every student will be randomly assigned one question and for that question must prepare a 1-page (maximum) memo that answers the question combining the analysis of the case with conceptual material in the course. The students have to email their memo to the instructor before the case study

is discussed in class. Students must submit at least 4 out of 8 memos during the course. Failure to submit at least 4 memos will result in penalties on this component of the grade. For students submitting more than 4 memos, the instructor will compute this component of the grade taking into account only the best 4 memos.

Final exam

At the end of the trimester, there will be an in-class written final exam. The exam may include questions about the mandatory readings, the concepts covered during lectures, and the discussions of the business cases. The final examination will be no longer than 60 minutes.

The competences, the learning outcomes, the assessment elements and the quality of the learning process included in this Teaching Plan will not be affected if during the academic trimester the teaching model has to switch either to a hybrid model (combination of face-to-face and on-line sessions) or to a complete on-line model.

Evaluation criteria

Evaluation will be based on class participation (20%), case reports (20%), team project presentation (25%), and the in-class final exam (35%). Passing the course requires obtaining a grade of at least 5 out of 10.

Students must attend at least 80% of the classes. Failing to do so without justified reason will imply a zero grade in the participation/attendance evaluation item and may lead to suspension from the program.

Students who fail the course during the regular evaluation are allowed ONE re-take of the final exam. If the course is again failed after the retake, the student will have to register again for the course the following year.

In case of a justified no-show to an exam, the student must inform the corresponding faculty member and the director(s) of the program so that they study the possibility of rescheduling the exam (e.g., “Retake” period). In the meantime, the student will get an “incomplete”, which will be replaced by the actual grade after the final exam is taken. The “incomplete” will not be reflected on the student’s Academic Transcript.

Plagiarism is to use another’s work and to present it as one’s own without acknowledging the sources in the correct way. All essays, reports or projects handed in by a student must be original work completed by the student. By enrolling at any UPF BSM Master of Science and signing the “Honor Code,” students acknowledge that they understand the schools’ policy on plagiarism and certify that all course assignments will be their own work, except where indicated by correct referencing. Failing to do so may result in automatic expulsion from the program.

Specific Competences

SC3. Solve managerial problems through the use of analytical and research techniques.

SC4. Acquire the skills for the design and implementation of problem-solving models, based on insights from the social sciences.

SC7. To integrate relevant and current scientific research to generate insights in support of business practice.

SC8. Apply the techniques and theories acquired in the Master's Degree to solve problems relevant to the business world.

Calendar and Contents

The course consists of lectures and business case discussions covering the following content areas:

- Evolution of Industries and Markets
- Disruption
- R&D Management
- Capturing Value from Innovation
- Intellectual Property
- Standards
- Platforms
- Artificial Intelligence

See the section “Schedule” for detailed contents.

Reading Materials/ Bibliography/Resources

See the section “Schedule” for readings and sources.

Bio of Professor

Cesare Righi is an Assistant Professor in the Department of Economics and Business at Universitat Pompeu Fabra, and an Affiliated Professor of the Barcelona School of Economics and the UPF Barcelona School of Management. His research investigates topics in strategy, economics of innovation, intellectual property rights, and technology standards. His work has been published in academic journals such as the *RAND Journal of Economics* and *Research Policy*. He received his Ph.D. in Management (concentration in Strategy & Innovation) from Questrom School of Business, Boston University. Before joining UPF, he was a Postdoctoral Associate at the Technology & Policy Research Initiative, Boston University School of Law. At UPF, he teaches Strategic Management II.

Schedule

This is a tentative version of the course schedule. Please note that the course schedule and the reading materials may be subject to change; pay careful attention to your instructor.

March 24: Introduction

Readings

- Syllabus of the course.

March 26: Evolution of Industries and Markets

Readings

- Klepper, S. (1997). Industry life cycles. *Industrial and Corporate Change*, 6(1), 145-182.
- Bresnahan, T. F., & Trajtenberg, M. (1995). General purpose technologies 'Engines of growth'? *Journal of Econometrics*, 65(1), 83-108.

March 26: Evolution of Industries and Markets

Readings

- EMI and the CT Scanner (A: HBS 9-383-194; B: HBS 9-383-195)

March 31: Disruption

Readings

- Christensen, C. (1997). How Can Great Firms Fail? Insights from the Hard Disk Drive Industry. Chapter 1 in Christensen, C. (1997) *The Innovator's Dilemma: When New Technologies Cause Great Firms to Fail*. Harvard Business Review Press, Boston, MA.
- King, A. A., & Baatartogtokh, B. (2015). How useful is the theory of disruptive innovation? *MIT Sloan Management Review*, 57(1), 77.
- Gans, J. S. (2016). Keep calm and manage disruption. *MIT Sloan Management Review*, 57(3), 83.

April 2: Disruption

Readings

- Netflix (HBS 9-607-138)

April 7: R&D Management

Readings

- Hounshell, D.A. (1996). The Evolution of Industrial Research in the United States. Chapter 1 in *Engines of Innovation: US Industrial Research at the End of an Era*, Rosenbloom, R. S. & Spencer, W.J. (eds). Harvard Business School Press, Boston, MA.
- Wheelwright, S. & Clark, K. (1992). Creating Project Plans to Focus Product Development. *Harvard Business Review* (March-April 1992).

April 9: R&D Management

Readings

- Vertex Pharmaceuticals: R&D Portfolio Management (A) (HBS 9-604-101)

April 28: Capturing Value from Innovation

Readings

- Teece, D.J. (1986). Profiting from Technological Innovation: Implications for Integration, Collaboration, Licensing and Public Policy. *Research Policy*, 15(6), 285-305.
- Gans, J.S., & Stern, S. (2003). The Product Market and the Market for "Ideas": Commercialization Strategies for Technology Entrepreneurs. *Research Policy*, 32(2), 333-350.

April 30: Capturing Value from Innovation

Readings

- Abgenix and the Xenomouse (HBS 9-600-033)

May 5: Intellectual Property

Readings

- Hall, B., Helmers, C., Rogers, M., & Sena, V. (2014). The choice between formal and informal intellectual property: a review. *Journal of Economic Literature*, 52(2), 375-423.
- Righi, C., & Simcoe, T. (2023). Patenting inventions or inventing patents? Continuation practice at the USPTO. *RAND Journal of Economics*, 54(3), 416-442.

May 7: Intellectual Property

Readings

- Qualcomm Incorporated 2009 (HBS 9-710-433)

May 12: Standards

Readings

- Shapiro, C., & Varian, H.R. (1999). The Art of Standards Wars. *California Management Review*, 41(2), 8-32.
- Farrell, J., & Simcoe, T. (2012). Four Paths to Compatibility. Chapter in Peitz, M. & Waldfogel, J. (eds) *Oxford Handbook of the Digital Economy* (pp. 34-58). Oxford University Press, Oxford, UK, and New York.

May 14: Standards

Readings

- Atheros Communications (HBS 9-806-093)

May 19: Platforms

Readings

- Eisenmann, T., Parker, G., & Van Alstyne, M. W. (2006). Strategies for Two-Sided Markets. *Harvard Business Review*, 84(10), 92.
- Hagiu, A. (2014). Strategic decisions for multisided platforms. *MIT Sloan Management Review*, 55(2), 71.
- Van Alstyne, M. W., Parker, G. G., & Choudary, S. P. (2016). Pipelines, Platforms, and the New Rules of Strategy. *Harvard Business Review*, 94(4), 54-62.

May 21: Platforms

Readings

- Platform LEEDership at USGBC (HBS 9-618-027)

May 26: Artificial intelligence

Readings

- Agrawal, A. K., Gans, J. S., & Goldfarb, A. (2017). What to expect from artificial intelligence. *MIT Sloan Management Review*, 58(3), 23.

- Cockburn, I. M., Henderson, R. M., & Stern, S. (2018). The Impact of Artificial Intelligence on Innovation. *NBER Working Paper*, (w24449).

May 28: Artificial intelligence

Readings

- Vodafone: Managing Advanced Technologies and Artificial Intelligence (HBS 9-318-109)

June 2: Students' presentations

June 4: Students' presentations

June 4: Wrap-up