

MGT-414

Technology & Innovation Strategy

Fall 2019

Wednesdays, 9:15 - 12:00

Room: ODY 016

Professor: Kenneth A. Younge

Office: Odyssea 202

E-mail: kenneth.younge@epfl.ch

<http://people.epfl.ch/kenneth.younge>

Office Hours: To be determined

Teaching Assistant

Max Hofer, Doctoral Student

E-mail: maximilian.hofer@epfl.ch

Office Hours: To be determined

Updated: September 16, 2019

COURSE OVERVIEW

This course focuses on the economic and organizational conditions that shape technological innovation by firms. The intent is for students to learn core concepts that can make innovation projects more successful and profitable, and to then apply those concepts to real business cases of known successes and failures. Strategic management differs from other courses in management in that it focuses on the firm as a unit as the level of analysis. Accordingly, the course objectives are threefold: (1) to develop an understanding of how innovations emerge and gain adoption in the marketplace; (2) to gain insights into how firms can transform themselves into effective innovators; and (3) to evaluate strategies and structures that enhance venture success. The course is particularly applicable for students interested in working for, or learning about, technology-oriented companies.

DIDACTIC APPROACH

The course will be taught through pre-assigned readings, lectures, readings handed-out in class, case discussions, and group work. We will analyze real companies as they learn to identify, generate, manage and exploit new and existing technologies, often in fast changing environments. Students will be placed in the role of key decision makers and asked to address issues related to the management of new business ventures and/or innovative new products and services.

Cell Phones, Laptops & Tablets

The use of cell phones in class is strictly prohibited. Cell phones detract from the learning environment and should be turned off during class. The use of laptop computers or tablets depends on the intent of use – they can either help or hurt the learning environment. On the upside, computers allow real time access to important information, and some students use their computers to take notes even as they continue to participate in the class. Laptops and tablets, however, also can be a distraction to other students, a temptation to let one's attention wander, and a way to avoid engaging in the class discussion. Overall, I have found that students who use laptops perform worse in the course than those who engage completely with the class. I therefore encourage you to minimize your use of laptops and tablets during class.

Diversity

Each person in the classroom potentially has something of value to contribute. Please take care to respect the different experiences, beliefs and values expressed by students and staff involved in the course. Individuals of all ages, backgrounds, citizenships, disability, sex, education, ethnicities, family statuses, genders, gender identities, geographical locations, languages, military experience, political views, races, religions, sexual orientations, socioeconomic statuses, and work experiences are welcome in this class, and are encouraged to add their point of view to class discussions. All members of the class bear a responsibility to voice their opinions in such a way as to contribute to the learning objectives of the class and to do so in a positive manner. The instructor may, at times, direct some conversations that do not further the learning objectives of a given day to continue outside of class, but doing so does not lessen our mutual commitment to valuing diversity in the classroom.

MATERIALS

A packet of business cases, titled “**Technology and Innovation Strategy, Fall 2019**” by Professor Younge will be available for purchase from Harvard Business School at: <https://hbsp.harvard.edu/import/639907> All other materials are available from the library.

LEARNING OUTCOMES

By the end of the course, students should be able to identify and evaluate strategies and structures that are more likely to lead to success. Students should also be able to apply theory and best practices for assessing the potential for new ideas to convert into new products, technologies and businesses. Students should be able to apply different theoretical perspectives on technology strategy and innovation, think creatively about alternative courses of action, and ask insightful questions.

EXAMINATIONS, ASSIGNMENTS & GRADING

15%	Class Participation	Individual	Participation is tracked each session
15%	Midterm Exam	Individual	Exam is given in a regular class session
15%	Individual Report	Individual	Due before the start of the final exam
15%	Team Project	Team	Due before the start of the final exam
40%	Final Exam	Individual	Exam is given in a regular class session

Midterm Exam

The midterm exam will be given during the normally scheduled class session. The midterm exam will cover all material up to that point in the course related to assigned readings, lectures, and handouts.

Individual Report

Analyze the technology and innovation strategy of **IBM Watson**. Using theory and logical reasoning, make an argument as to whether it – was, is, and will be – a good idea for IBM invest so heavily on the Watson. What is the industry like? What are the strategic factor markets like? Has IBM (can IBM) accumulate the resources to successfully compete in this space (i.e., Artificial Intelligence, Data Science, Business Analytics)? Can IBM appropriate quasi-rents in the space? Be clear about the criteria, the timeframe, and the analytical factors you rely on to evaluate whether it is a “good” idea?

This is an *individual* assignment. Do **not** work on it with others in any way whatsoever. Do your own work. If you pick up facts and/or ideas from others from research, then cite your sources. Your paper will be checked for plagiarism with respect to others in the class and with respect to other online articles and sources.

The maximum length for the report is four, double-spaced pages in 11-pt Times Roman font (i.e., the front and back of two physical sheets of paper). Anything over the page limit will be ignored, so use the allotted space wisely. Exhibits and references do not count toward the limit, so you may attach tables, graphs, and other supporting materials – as you see best.

Due: **Email your report to the instructor** before the start of the final exam.

Format: **PDF** – other formats will incur a penalty.

Length: **4 pages**. 11-pt Times Roman font, double-spaced.

Team Project

After the midterm, the professor will assign you to a group to conduct a case study of a company. Your team can select the company to study from a list of companies provided by the Professor. To select a company, email the professor a rank-ordered list of your top 5 choices. There are two deliverables for this assignment: (1) a presentation, and (2) a report.

(1) **Presentation:** Each team should prepare a five-minute presentation of their analysis, which you will deliver to the class for critique on the designated day. Presentations should be 5 to 8 slides in length. After your presentation, you will field questions from the professor and other students in the class. The presentation will be graded based on your slides, verbal presentation, and ability to answer questions.

Due: **Email your presentation slides to the instructor** before the start of your presentation.

Format: **PDF** – other formats will incur a penalty.

Length: **5 to 8 slides**.

(2) **Report:** Each team should also prepare a final report. The maximum length for the final report is four, double-spaced pages in 11-pt Times Roman font (i.e., the front and back of two physical sheets of paper). Anything over the page limit will be ignored, so use the allotted space wisely. Exhibits and references do not count toward the limit, so you may attach tables, graphs, and other supporting materials – as you see best. Given the page limitation, you will not have space to address every concept covered in the course, or every aspect of the firm – so you must focus on factors that you believe are particularly important for your case. Final reports should take into consideration questions and answers made during the class presentation.

Due: **Email your report to the instructor** before the start of the final exam.

Format: **PDF.** Other formats will not be accepted.

Length: **4 pages.** 11-pt Times Roman font, double-spaced.

Class Participation

Class participation is a graded component of this course. You will be evaluated based on how well you prepare for class (your preparation), the quality of the questions and comments you make in class (your contribution), the effectiveness with which you work with others to advance the discussion (your group skills), and your overall skill at communicating your ideas (your communication). A grading rubric and an example grading sheet appear at the end of the syllabus. The instructor will track class participation each session on a grading sheet. The Instructor may also cold-call on students in order to assess the degree to which students meet each of the four graded criteria.

High quality class participation requires you to do **all of the readings before class** and to prepare a **list of questions and comments** that you can reference during class. If you prefer to NOT attend class, then you should compile your questions and comments into a coherent essay and submit it to the instructor within one week of the missed class session (essays should be around one page long, single-spaced, 12-pt Times Roman font, in PDF format), and the instructor will grade the essay as the basis of class participation.

If you have concerns about your ability to participate in class discussions, please contact me immediately – preferably in the first two weeks of the course. We will develop a plan of study for you to help you to participate. I also recommend seeing myself, or the TA, on office hours to work on your ideas before class; in that way you will be better prepared and more motivated to participate when the time is right during class.

Please keep in mind that **low-quality participation** entails listening to the material during class and then simply asking questions that would have been clear if you had prepared before class. Comments of that nature count against class participation. Instead, high quality comments tend to: (a) Offer a different, unique, and yet *relevant* perspective on the issue; (b) Build on the comments of others in the class; (c) Include evidence or analysis of the inherent tradeoffs between options (i.e., demonstrate reflective thinking); and (d) Help to move the discussion forward.

To make it easier for me to call on you, please use a name card and place it in front of you on your table. Each name card should include your **first name and last initial**. Printing it on card-stock makes it easier to prop up. **Bring your name card with you to every class.** Failure to display a name card may result in a lower grade for class participation.

I will attempt to call on every student who wishes to speak in each session. I also will attempt to call on people who have not participated yet before I call on people who have already participated. Please raise your hand so that I can see you and call on you. Once you have participated, please try and restrain yourself for a while so others may get a chance to speak. If you feel that you wanted to talk and had your hand up but I didn't call on you, please let me know by email so that I may make a note and make an extra effort to include you in the discussion in the next class.

Final Exam

The final exam will be given during the normally scheduled class session. The final exam will cover all material up to that point in the course related to assigned readings, lectures, and handouts.

All deliverables must be submitted by email.

Do NOT print out assignments and hand them in. All assignments **must** be submitted electronically to the instructor **by email** as an attachment in **PDF format**. Please start your email subject line with **MGT-414** - then include your **last name** - then the **assignment name**. For example, the subject line might read: "MGT-414 - Smith - Innovation Report." Your sent-email record will serve as proof of submission, so hold on to it. The instructor may use anti-plagiarism tools to check the originality of your assignment.

ABOUT YOUR INSTRUCTOR

Kenneth Younge is an Associate Professor in Technology and Innovation Strategy at the College of Management of Technology (CDM) at the École Polytechnique Fédérale de Lausanne (EPFL). Before joining EPFL, he was an Assistant Professor at Purdue University, a post-doctoral scholar at the University of California Berkeley and a doctoral student and instructor at the University of Colorado Boulder. He is a past winner of the Academy of Management's Business Policy and Strategy Division Outstanding Dissertation Award, the Strategic Management Society's Best Conference Paper Award, several Distinguished Teacher awards from Purdue University, and the Leeds Outstanding Teaching Award for a Doctoral Student. Prior to returning to academia, Professor Younge worked for 14 years in industry in the areas of business development, Director of Development, Chief Technology Officer, and President. He graduated *Magna Cum Laude* and Phi Beta Kappa from Brown University, and then began his career as a Strategic Management Consultant with Mercer Management Consulting (now Oliver Wyman). Later in his career went on to found four firms. Professor Younge's research examines the strategic importance of innovation and employee mobility between firms.

ABOUT YOUR TEACHING ASSISTANT

Maximilian joined the TIS lab in October 2018 to investigate the impact of artificial intelligence (AI) on business. Prior to EPFL, he graduated at the top of his class from University College London (UCL) with a Bachelor in Management Science. He subsequently studied theoretical computer science with a focus on deep neural networks for natural language processing at the University of Oxford, graduating with a Master's degree in 2018. At EPFL, Maximilian empirically analyses how AI transforms different aspects of business, including strategy, competition and innovation.

ARTICLES

- Session 1** Porter, M. (2008). "The 'Five Forces' that shape strategy." *Harvard Business Review*, 86(1).
- Session 2** Barney, J. B. (1986). "Strategic factor markets: expectations, luck, and business strategy." *Management Science* 32(10).
- Session 3** Barney, J. B. (1991). "Firm Resources and Sustained Competitive Advantage." *Journal of Management* 17(1).
- Dierickx, I. and Cool, K. (1989). "Asset Stock Accumulation and the Sustainability of Competitive Advantage." *Management Science* 35(12).
- Session 4** Argote, L. and Epple, D. (1990). "Learning Curves in Manufacturing," *Science*, 247.
- Luehrman, T. (1998) "Investment opportunities as real options: Getting started on the numbers." *Harvard Business Review*, 76.
- Session 5** Williamson, O. (2002). "The Theory of the Firm as Governance Structure: From Choice to Contract." *The Journal of Economic Perspectives*, 16(3).
- Teece, D. J. (1982). "Towards an economic theory of the multiproduct firm." *Journal of Economic Behavior & Organization* 3(1).
- Session 7** Lemley, M. A. and C. Shapiro (2005). "Probabilistic patents." *Journal of Economic Perspectives*, 19(2).
- Gans, J. and Stern, S. (2010) "Is there a market for ideas?" *Industry & Corporate Change*, 19: 3.
- Session 8** Mollick, E. "People and Process, Suits and Innovators: The Role of Individuals in Firm Performance." *Strategic Management Journal*, 33:9 (2012).
- Sadun, R., Bloom, N. and Van Reenen, J. (2017). "Why do we undervalue competent management?" *Harvard Business Review*.
- Session 9** Raj, M. and R. Seamans (2019). "Primer on artificial intelligence and robotics." *Journal of Organization Design* 8(1).
- Session 10** Nanda, R. and Rhodes-Kropf, M. (2016). "Financing Entrepreneurial Experimentation." *Innovation Policy and the Economy* 16.
- Raynor, M. (2007). "Solving the strategy paradox: how to reach for the fruit without going out on a limb." *Strategy & Leadership* 35:4.
- Session 11** Knudsen, T., Levinthal, D. and Winter, S. (2014). "Hidden but in plain sight: The role of scale adjustment in industry dynamics." *Strategic Management Journal* 35:11.
- Zenger, T. (2013a). "What is the Theory of Your Firm?" *Harvard Business Review*.
- Session 13** Peteraf, M. (1993). "The cornerstones of competitive advantage: a resource-based view." *Strategic Management Journal*, 14:3.
- Zenger, T. (2013b) "Strategy: The Uniqueness Challenge." *Harvard Business Review*.

HBR BUSINESS CASES AND ARTICLES

Purchase the following cases here: <https://hbsp.harvard.edu/import/571845>

Apple Inc. in 2012

David B. Yoffie; Penelope Rossano

HBS 9-712-490

Mobileye: The Future of Driverless Cars

David B. Yoffie

HBS 5-715-447

Hewlett-Packard: The Flight of the Kittyhawk (A)

Clayton M. Christensen

HBS 9-606-088

Nucleon, Inc.

Gary P. Pisano

HBS 9-692-041

Intellectual Ventures

Andrei Hagi; David B. Yoffie; Alison Berkley Wagonfeld

HBS 9-710-423

Big Spaceship: Ready to Go Big?

Boris Groysberg; Michael Slind

HBS 9-409-047

Digitalization at Siemens

David J. Collis, Tonia Junker

HBS 9-717-428

Box, Inc.: Preserving Start-Up Culture in a Rapidly Growing Company

Allan Cohen

BAB723

Danaher Corporation

Bharat Anand; David Collis; Sophia Hood

HBS 9-708-445

CLASS PARTICIPATION – GRADING RUBRIC

The following are the criteria by which class participation will be assessed in the course.

Rubric for grading class participation

Type of participation with examples	Excellent 6	Very good 5	Satisfactory 4	Unsatisfactory 0	Suggestions / comments
Preparation: reading, analyzing and understanding of the material to be read before the class. Demonstrated by contribution to discussion; reading prepared questions for class, reading out other work.					
Contribution to discussion: extent to which you volunteered answers, asked relevant questions, expressed your own opinion, summarize what other say. Bridging concepts with relevant examples or information. Providing correct answers to questions asked.					
Group skills: extent to which you allowed others to contribute (not dominating the discussion), shared relevant ideas, provided positive feedback, tolerance to other views and listen to others.					
Communication skills: quality of your expression, clarity, conciseness, use of words and concepts relevant to the class correctly, adequate vocabulary, confidence.					

CLASS PARTICIPATION – GRADING SHEET

The following is an example of the grading sheet that will be used to grade class participation in each session.

Student Name	Preparation				Contribution				Group Skills				Communication				Notes & Comments
	0	4	5	6	0	4	5	6	0	4	5	6	0	4	5	6	

MGT 414 COURSE SCHEDULE

I. Economic Foundations of Strategy

	Date	Topic	Articles	Cases
1.	Sept 18	Market Competition	Porter, 2008	None
2.	Sept 25	Resource Competition	Barney, 1986	Apple
3.	Oct 2	Competitive Advantage	Barney, 1991 Dierickx & Cool, 1989	Mobileye
4.	Oct 9	Technological Change & Real Options	Argote & Epple, 1990 Luehrman, 1998	Kittyhawk
5.	Oct 16	Theory of the Firm	Williamson, 2002 Teece, 1982	Nucleon
6.	Oct 23	Midterm Exam		

II. Topics in Technology and Innovation

	Date	Topic	Articles	Case
7.	Oct 30	Technology: R&D, Invention & IP	Lemley & Shapiro, 2005 Gans & Stern, 2010	Intellectual Ventures
8.	Nov 20	Innovation: Driven by People? or Process?	Mollick, 2012 Sadun et al, 2017	Big Spaceship
9.	Nov 27	Digitalization: AI, Robotics, Automation	Raj & Seamans, 2019	Siemens
10.	Nov 13	Experimentation: 2-Stage Learning & Market Entry	Nanda & Rhodes-Kropf, 2016 Raynor, 2007	Box
11.	Nov 6	Expansion: Growth, Productivity, Scale	Knudsen et al, 2014 Zenger, 2013a	Danaher
12.	Dec 4	Team Presentations	None	None
13.	Dec 11	Course Review & Synthesis	Peteraf, 1993 Zenger, 2013b	SpaceX & Tesla (student research)
14.	Dec 18	Final Exam		