Technology & Innovation Strategy

MGT-414, Fall 2017
Wednesdays, 9:15 - 12:00
4 credits

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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.

COURSE SCHEDULE

This course is divided into two parts: Strategy Formulation and Strategy Implementation. The first half of the course is focused on economic principles and abstract concepts (strategy formulation), whereas the second half of the course is more focused on a contextual understanding of different applied topics (strategy implementation).

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<th>Part I – Strategy Formulation</th>
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<th>Part II – Strategy Implementation</th>
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DIDACTIC APPROACH AND CLASS ATTENDANCE

The course will be taught through pre-assigned readings, readings distributed during class, lectures, and case discussions. 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.
Attendance

Students are expected to attend every class and to read all assigned materials before the start of each class; students are also expected to participate in class discussions. As such, class participation is a graded component of the course. Verbal participation will be tracked by the instructor and quizzes may (at times) be administered at the start of class to assess the degree to which students have prepared for the class. Failure to attend a class will result in no credit for the associated quiz or case discussion. If an absence is pre-excused, however, students may submit a two-page written essay (11-pt font, single-spaced, on one piece of paper) reviewing the topic of the missed class and recover (at the instructor’s discretion) some or all of the lost participation points for the class. Arriving late to class counts against the class participation grade.

Cell Phones

The use of cell phones detracts from the learning environment. Therefore, please turn off cell phones during class.

Laptops & Tablets

Connectivity in the classroom can both help and hurt the learning environment. On the upside, computers allow real time access to important information. Many students also use their computers to take notes, even as they continue to participate in the class. However, laptops and tablets also can be a distraction to other students, a temptation to let one’s attention wander, and a way to avoid engaging in the discussion. Overall, I have found that students using laptops do more poorly in the course than those who engage completely in the discussion. I therefore encourage you to minimize your use of laptops and tablets during class.

Diversity

Each person in the classroom has something of value to contribute. Please take care to respect the different experiences, beliefs and values expressed by students and staff involved in this 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 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

Business cases will be distributed online via a customized case packet from Harvard Business Publishing. The packet is identified as ‘MGT-414: Technology and Innovation Strategy’ by Professor Younge.

All other assigned readings are available from the EPFL library or by inter-library loan.

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

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<th>Percentage</th>
<th>Assignment</th>
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<td>10%</td>
<td>Innovation Report</td>
<td>Analysis of SpaceX - due before start of midterm</td>
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<tr>
<td>10%</td>
<td>Midterm Exam</td>
<td>Administered during class</td>
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<tr>
<td>20%</td>
<td>Analysis of Tesla</td>
<td>Written report due before the start of the last class</td>
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<tr>
<td>20%</td>
<td>Team Project</td>
<td>Case analysis/report due before start of the last class</td>
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<td>20%</td>
<td>Class Participation</td>
<td>Tracked throughout the semester</td>
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<td>20%</td>
<td>Final Exam</td>
<td>Time &amp; location to be determined</td>
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Innovation Report - SpaceX (10%)

Students should research and write a strategic analysis of SpaceX. You should produce your own work and **you should not collaborate** on the report. The assignment is not intended to be a full "case study" of SpaceX - instead, the objective is to illustrate one or more of the strategy concepts covered in class. The maximum length for the report is one physical sheet of paper (i.e., the front-side and a back-side of one piece of paper); anything over one physical piece of paper will be ignored, so use the space wisely.

**Due:** Email your report to the TA before the start of the midterm examination.
**Format:** PDF - other formats will not be accepted.
**Length:** 2 pages, 11-pt Times Roman font, single-spaced.

Midterm Exam (10%)

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.

Consulting Report - Tesla (20%)

Students should prepare their own, in-depth examination of Tesla. You may discuss your arguments with other students, but keep in mind that the objective of the assignment is to stand out and distinguish yourself within the class. **Each student must therefore write their own report.** The maximum length for the report is two physical sheets of paper (i.e., the front-side and a back-side of two pieces of paper); anything over one physical piece of paper will be ignored, so use the space wisely.

**Due:** Email your report to the TA before the start of the last class.
**Format:** PDF - other formats will not be accepted.
**Length:** 4 pages, 11-pt Times Roman font, single-spaced.

Team Project / Case Study (20%)

At the start of the 9th session, we will assign students into groups of three to complete a case study of one of the companies on the MIT Technology Review’s list of the 50 smartest companies (from the years 2017 or 2016). Consult the most recent list here: https://www.technologyreview.com/lists/companies/2017/intro/

Each team must pick a different company. To make your selection, send the course TA a rank ordered list of your top 10 choices. Company assignments are on a “first-come-first-serve” basis (based on order email is received) – so don’t delay in making your selection. You may not select Tesla, SpaceX, Apple, Amazon, or any other company we already cover in-depth in class.

There are two deliverables for this assignment: 1) a presentation; 2) a report.

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

Due: Email your presentation slides to the TA before the start of the presentation class.
Format: PDF - other formats will not be accepted.
Length: 5 to 8 slides.

2) Report: Each team should also prepare a two-page final report. Given the page limitation, you will not have space to address every concept covered in the course, or every aspect of the firm. Anything over two pages will be ignored, so use the allotted space wisely. Exhibits, however, do not count toward the page limit – so you may attach as many exhibits, tables, and supporting reference materials as you wish. Final reports should take into consideration questions and answers made after the initial presentation.

Due: Email your report to the TA before the start of the last class.
Format: PDF - other formats will not be accepted.
Length: 2 pages, 11-pt Times Roman font, single-spaced.

Class Participation (20%)
You will be evaluated based on how well you prepare for class, and on the quality of the questions and comments you contribute to the class. High quality participation requires you to do all of the readings before class and to prepare a list of questions and comments. Low-quality participation entails listening to the material during class and then asking questions that would have been clear if you had prepared before class. Quality comments possess one or more of the following attributes: (a) Contribute to moving the discussion forward; (b) Offer a different, unique, and yet relevant perspective on the issue; (c) Build on the comments of others in the class; and (d) Include evidence or analysis of the inherent tradeoffs between options, i.e., demonstrate reflective thinking.

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 class participation grade.

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 we call on people who have already participated. Please raise your hand in a vigorous manner so that I can see you clearly so I can 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.

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 that will help you to be sure to participate. I also recommend seeing myself, or the TA, on office hours to work out your ideas; in that way you will be better prepared and more motivated to participate when the time is right during class.

If you consistently find yourself unable to participate in the classroom discussion, then you may alternatively prepare a one-page essay on the assigned readings for that week and submit it to me at the beginning of class.

Final Exam (20%)
The final exam is comprehensive, across the entire course, and covers all material presented in lectures, assigned readings, and business cases. It will be taken during the assigned winter exam – location and time to be determined by EPFL and announced in class.

Submit assignments by email
Do NOT print out assignments and hand submit them. All assignments must be submitted electronically to the professor 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 - YOUNGE - Consulting 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.
DETAILED COURSE OUTLINE

Part I – Strategy Formulation

1. Market Competition
   a. The ‘Five Forces’ that shape strategy
      
      Porter, 2008
      
      Case: Apple Inc. 2012
      
      HBS 9-712-490

2. Resource Competition
   a. The cornerstones of competitive advantage
      
      Peteraf, 1993
      
      Case: Mobileye: The Future of Driverless Cars
      
      Dierickx & Cool, 1989
      
      HBS 5-715-447

3. Technological Change
   a. S-curves, learning curves, experience curves
      
      Argote & Epple, 1990
      
      Case: SpaceX
      
      Arora, Belezon & Patacon, 2015
      
      Individual research

4. Dynamics & Options
   a. Dynamic capabilities
      
      King & Tucci, 2002
      
      Case: HP Kitty Hawk
      
      Luehrman, 1998
      
      HBS 9-606-088

5. Entrepreneurship
   a. Experimentation
      
      Kerr, Nanda, Rhodes-Kropf, 2014
      
      Litov, Moreton & Zenger, 2012
      
      Case: Angel List
      
      HBS 9-814-036

6. Invention & Intellectual Property
   a. Invention
      
      Arrow, 1962
      
      Lemley & Shapiro, 2005
      
      Case: Intellectual Ventures
      
      Teece, 1986
      
      Gans & Stern, 2010
      
      HBS 9-710-423

7. Theory of the firm
   a. Firm boundaries
      
      Seru, 2014
      
      Case: Nucleon
      
      Raynor, 2007
      
      HBS 9-692-041

8. Midterm exam
   a. Consulting reports due by the start of class.
DETAILED COURSE OUTLINE

Part II – Strategy Implementation

9. Market entry
   a. Open innovation Felin & Zenger, 2014
   b. Judo strategy Distributed by Professor
   Case: Box, Inc.

10. Human capital
    a. Individuals Mollick, 2012
    b. Teams Wuchty, Jones & Uzzi, 2007
    Case: Big Spaceship HBS 9-409-047

11. Productivity
    b. Economies of scale Knudsen, Levinthal & Winter, 2014
    Case: Danaher HBS 5-713-412

12. Business analytics
    a. Big Data McAfee & Brynjolfsson, 2012
    b. Internet of Things Porter & Heppelmann, 2014
    Case: Amazon Web Services HBS 9-609-048

13. Team presentations
    Each team has 5 minutes to present + Q&A
    Q&A: Posing insightful questions will count heavily for class participation.

14. Course review & synthesis
    a. The cornerstones of competitive advantage (read it again) Peteraf, 1993
ARTICLES


CASES

Purchase the following cases here: http://cb.hbsp.harvard.edu/cbmp/access/65963042

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

AngelList  
Ramana Nanda; Liz Kind  
HBS 9-814-036

Nucleon, Inc.  
Gary P. Pisano  
HBS 9-692-041

Box. Inc.: Preserving Start-Up Culture in a Rapidly Growing Company  
Allan Cohen  
BAB723

Intellectual Ventures  
Andrei Hagiu; David B. Yoffie; Alison Berkley Wagonfeld  
HBS 9-710-423

Big Spaceship: Ready to Go Big?  
Boris Groysberg; Michael Slind  
HBS 9-409-047

Danaher Corporation  
Bharat Anand; David Collis; Sophia Hood  
HBS 9-708-445

Amazon Web Services  
Robert S. Huckman; Gary P. Pisano; Liz Kind  
HBS 9-609-048