

USC Marshall School of Business

MOR 499: Approaches to Technology Strategy

Monday and Wednesday 4pm-5:50pm

4 units: 1hr 50min twice weekly

Online class: meets on Zoom

Spring 2021

Professor: Florenta Teodoridis

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Office Hours: By appointment; email is the best way to contact me, I check it regularly.

COURSE DESCRIPTION

For businesses, making decisions about responding to a new technology developed by someone else or about introducing a new technology is integral to strategizing on how to compete in the marketplace. This course introduces general strategy approaches to managing technology in business – sets of choices about if and how to use new technology as a strategic business consideration. Choices imply tradeoffs. Thus, the course explores the development and application of conceptual approaches that aim to balance the allocation of scarce business resources as informed by interactions between competition, patterns of technological change, and internal firm capabilities. The course draws from current trends of artificial intelligence technologies, among other historical examples, to exemplify these theoretical concepts and frameworks.

LEARNING OBJECTIVES

Upon successful completion of the course, students will have the knowledge and skills to:

1. Explain the fundamental characteristics of a technology strategy.
2. Analyze the expected evolution trajectory of new technological waves.
3. Appraise the potential impact of new technological waves.
4. Analyze the main structural features of a company and industry with respect to the actual and potential impact of technologies.
5. Explain the different aspects of technology development and evolution that need to be considered when formulating a technology strategy.
6. Recognize the implications of getting engaged in technological innovation relative to being solely a technology consumer.
7. Explain the core attributes that influence optimal decisions of technology commercialization strategies.
8. Perform a high-level technology strategic analysis that demonstrate an understating of the main factors that need to be considered and the relationships between them.
9. Provide a thoughtful critique of others' arguments, analyses and supporting evidence.
10. Communicate your arguments coherently and persuasively.

REQUIRED MATERIALS

- Some cases and readings are available in the online case pack from Harvard Business School Publishing. There are also readings from two widely available books. One book is mandatory, the

other is optional, see below. I am putting as many readings as possible in Blackboard to save costs, but some are under license agreement.

- Link to HBS course pack: <https://hbsp.harvard.edu/import/789060>
- Books:
 - *Required:* Agrawal, Ajay, Joshua Gans, and Avi Goldfarb. Prediction Machines: The Simple Economics of Artificial Intelligence. Harvard Business Review Press, 2018
 - *Optional:* Brynjolfsson, Erik and Andrew McAfee. The Second Machine Age, Norton: New York, 2016

COURSE NOTES:

Electronic communication for this course will take place through Blackboard, including lecture notes and information about the team project, etc. Check the Blackboard course page regularly.

The course is comprised of a mixture of lecture sessions and case analysis sessions. To provide a fuller perspective on the course topics, I will also utilize some guest speakers (TBA) to provide a different perspective and insights.

GRADING POLICIES:

| <u>Assignments</u> | <u>Points</u> | <u>% of Overall Grade</u> |
|--|----------------------|----------------------------------|
| <i>Class Participation</i> | <i>15</i> | <i>15%</i> |
| <i>Case memo 1 (Autonomous vehicles)</i> | <i>15</i> | <i>15%</i> |
| <i>Case memo 2 (Amazon)</i> | <i>15</i> | <i>15%</i> |
| <i>Team project written report</i> | <i>20</i> | <i>20%</i> |
| <i>Team project oral discussion</i> | <i>10</i> | <i>10%</i> |
| <i>Final exam</i> | <i>25</i> | <i>25%</i> |
| <i>TOTAL</i> | <i>100</i> | <i>100%</i> |

Participation – 15%

Regular class participation is critical to successfully completing this course. You are expected to participate actively in each class session. You are encouraged to prepare for class with your colleagues. However, each member of the class should be fully conversant in the material. If for some reason you are not prepared, please let me know before the start of class to save us both the embarrassment of my calling on you.

Given the importance of class discussion, pre-class preparation is crucial. For cases, you should be prepared to set forth the core challenge facing the case protagonist(s), offer a critical assessment of the situation, and lay out cogently and persuasively a course of action. For readings, you should be prepared to outline the topic that each reading addresses, describe its central points, and offer your critical analysis of them. When cases and readings are assigned for the same day, you should be able to draw links between the case and reading in your discussion.

Disruptive behaviour, including but not limited to, arriving late, entering and exiting during the class, side conversations in class and use of cell phone will lower your participation grade as it distracts from the class discussion.

Assignment questions for each session will be posted to the course page in Blackboard, typically at least a week prior to the class for which they are assigned.

It is important to appreciate that class discussion is itself a collaborative activity. Please listen carefully to one another and attempt to build on or constructively critique prior comments. An effective participant:

- Is a good listener;
- Makes points relevant to the ongoing discussion;
- Makes comments that add to our understanding of the case, topic and/or article;
- Is willing to challenge ideas that are being expressed; and
- Integrates material from a variety of sources (e.g., past classes, other courses, and their own experience) to the discussions in class.

Class Participation—Behavioral Anchor Rating Scale:

Excellent Performance

- Initiates information relative to topics discussed
- Accurately incorporates knowledge of assignment content (cases, articles and lectures)
- Clarifies complex, nuanced points
- Shares relevant personal experiences or opinions related to the topic
- Actively participates in class exercises but does not try to dominate the conversation
- Demonstrates ability to apply, analyze, evaluate & synthesize course material
- Demonstrates willingness to attempt to answer challenging questions
- Effectively builds on other students' contributions

Average Performance

- Participates in group discussions rarely or when asked
- Demonstrates basic knowledge of course material
- Offers clear, concise, “good” information relative to class assignments
- Offers input, but tends to reiterate basic points or repeat points other have made
- Attends class regularly

Unacceptable Performance

- Fails to participate even when directly asked
- Gives no input to discussions
- Does not demonstrate knowledge from the readings or lectures
- Shows up to class: does nothing
- Distracts group / class (side conversations, entering and leaving class, etc.)
- Participation distracts from main flow of discussion

Case memo — 2 assignments x 15% each

The case memo centers on a question (or set of questions) useful to help you focus on the strategic dilemma faced by the protagonists in the case. I'll post the questions on Blackboard. The report should not exceed three pages double-spaced (excluding any attachments) and should discuss not only what happened since the end of the case (no more than half a page) *but also the lessons learned in light of the concepts discussed throughout the course—this latter topic should be the main focus of the report.* The assignment is due (emailed to me or hardcopy) at the beginning of class on the day we discuss the case—no assignments will be accepted after we have discussed the case.

Team Project – 20% (written report) +10% (presentation)

Term projects will be completed in teams of 4-5 students, who are self-selected to work together. Teams should be finalized (and emailed to me) no later than the 3rd class session. Teams are used in this course because teams play central roles in organizations. Working in teams provides you with an opportunity to learn from your colleagues, and practice (and evaluate your own effectiveness) working, managing, solving problems, and making strategic decisions in a setting that approximates the management teams typically charged with such tasks.

Your team will need to select a company of their choice (the ones covered in any of the cases listed in the class schedule are excluded) and analyze its technology strategy. The deliverables consist of a written report, a peer assessment and an oral in-class presentation. I will provide instructions on how to structure the assignment in order to combine all applicable class learnings - too broad and your report will lack analytical depth, too narrow and your report will lack substance. You need to clear your selected company with me in advance. Teams are not allowed to select the same company; the proposals will be evaluated on a first-come-first-served basis.

Oral in-class presentation: I will evaluate how effectively you state your arguments and answer your colleagues' questions. The entire team needs to make their voice heard either during the presentation or the Q&A. I'll announce the length of the allocated time once the teams are formed and I know the total number of teams in the class.

Written Report: The report should not exceed five pages double-spaced (excluding any attachments). *The report should not weight on summarizing the class reading assignments but rather focus on applying those insights to analyze the chosen company or business situation.*

Peer assessment: Each of you will complete a peer evaluation of the members of your team with respect to the team final project. A copy of the peer evaluation form will be posted to Blackboard and is due on the day of the written report. Scores for individual student contributions to the team final project are assigned by me, based on my assessment of the team's project quality, my observations of the team's working dynamics and thoughtful consideration of the information provided through your peer evaluations.

All these materials are due April 19, 2021 before class start. There is no need to submit your slides.

I have set aside three full class sessions for team project presentations at the end of the term. The order of presentation will be random, and I will announce it the week before. I expect all students to attend these sessions and be actively engaged in asking question. Your performance as an audience member will count towards your participation grade.

Final exam

A final exam will be held during the exam week, date TBA. No make-up exam opportunities will be offered other than for religious observances.

ONLINE SYNCHRONOUS SESSIONS

In order to earn full participation points, students must actively participate in all synchronous sessions via computer or laptop, with a webcam and headset/speakers. You are expected to be in a location with a reliable internet connection and without distractions. You need to be able to fully engage at all times. Students are expected to be visually present and to ask thought-provoking questions, offer relevant comments, and answer questions from faculty in a clear and concise manner. If the class meets at a time outside of 7:00am to 10:00pm in time zone, please consider registering for a section that meets then. If you are unable to do this, please contact your professor immediately.

As outlined in the student handbook, there are specific expectations of a student attending class online. When attending, present and act appropriate as if you were in a physical classroom.

Please do:

- Attend class from a quiet area, free of distractions.
- Dress respectfully. Video conference business meetings are and will be the norm, so practice your professional telepresence.
- If you use a virtual background, please keep it respectfully professional
- Display both your first and last name during video conferencing and Synchronous class meetings.
- Respectfully minimize distractions by muting and or turning video off when moving around
- Engage in appropriate tone and language with instructors or classmates
- Disagree respectfully
- Respectfully pay attention to classmates

Please do not:

- Engage in a simultaneous activity (e.g., using a telephone)
- Interact with persons who are not part of the class
- Leave frequently or not be on camera for extended periods of time
- Have other persons or pets in view of the camera
- Behave in an overtly inattentive manner (looking distracted, not participating)

USC Statement on Academic Conduct and Support Systems

Academic Conduct:

Students are expected to make themselves aware of and abide by the University community's standards of behavior as articulated in the [Student Conduct Code](#). Plagiarism – presenting someone else's ideas as your own, either verbatim or recast in your own words – is a serious academic offense with serious consequences. Please familiarize yourself with the discussion of plagiarism in *SCampus* in Part B, Section 11, “Behavior Violating University Standards” <https://policy.usc.edu/scampus-part-b/>. Other forms of academic dishonesty are equally unacceptable. See additional information in *SCampus* and university policies on scientific misconduct, <http://policy.usc.edu/scientific-misconduct>.

Support Systems

Counseling and Mental Health - (213) 740-9355 – 24/7 on call
studenthealth.usc.edu/counseling

Free and confidential mental health treatment for students, including short-term psychotherapy, group counseling, stress fitness workshops, and crisis intervention.

National Suicide Prevention Lifeline - 1-800-273-8255 suicidepreventionlifeline.org

Provides free and confidential emotional support to people in suicidal crisis or emotional distress 24 hours a day, 7 days a week.

Relationship and Sexual Violence Prevention and Services (RSVP) - (213) 740-9355(WELL), press “0” after hours – 24/7 on call studenthealth.usc.edu/sexual-assault

Free and confidential therapy services, workshops, and training for situations related to gender-based harm.

Office of Equity and Diversity (OED)- (213) 740-5086 | Title IX – (213) 821-8298 equity.usc.edu, or titleix.usc.edu

Information about how to get help or help someone affected by harassment or discrimination, rights of protected classes, reporting options, and additional resources for students, faculty, staff, visitors, and applicants. The university prohibits discrimination or harassment based on the following *protected characteristics*: race, color, national origin, ancestry, religion, sex, gender, gender identity, gender expression, sexual orientation, age, physical disability, medical condition, mental disability, marital status, pregnancy, veteran status, genetic information, and any other characteristic which may be specified in applicable laws and governmental regulations. The university also prohibits sexual assault, non-consensual sexual contact, sexual misconduct, intimate partner violence, stalking, malicious dissuasion, retaliation, and violation of interim measures.

Reporting Incidents of Bias or Harassment - (213) 740-5086 or (213) 821-8298
usc-advocate.symplicity.com/care_report

Avenue to report incidents of bias, hate crimes, and microaggressions to the Office of Equity and Diversity | Title IX for appropriate investigation, supportive measures, and response.

USC Support and Advocacy - (213) 821-4710 uscsa.usc.edu

Assists students and families in resolving complex personal, financial, and academic issues adversely affecting their success as a student.

Diversity at USC - (213) 740-2101 diversity.usc.edu

Information on events, programs and training, the Provost's Diversity and Inclusion Council, Diversity Liaisons for each academic school, chronology, participation, and various resources for students.

USC Emergency - UPC: (213) 740-4321, HSC: (323) 442-1000 – 24/7 on call dps.usc.edu, or emergency.usc.edu

Emergency assistance and avenue to report a crime. Latest updates regarding safety, including ways in which instruction will be continued if an officially declared emergency makes travel to campus infeasible.

USC Department of Public Safety - UPC: (213) 740-6000, HSC: (323) 442-120 – 24/7 on call dps.usc.edu
Non-emergency assistance or information.

Office of Disability Services and Programs - (213) 740-0776 dps.usc.edu, ability@usc.edu.

USC is committed to making reasonable accommodations to assist individuals with disabilities in reaching their academic potential. Services include assistance in providing readers/notetakers/interpreters, special accommodations for test taking needs, assistance with architectural barriers, assistive technology, and support for individual needs. If you have a disability which may impact your performance, attendance, or grades in this course and require accommodations, you must first register with the Office of Disability Services and Programs (dsp.usc.edu) provides certification for students with disabilities and helps arrange the relevant accommodations. Any student requesting academic accommodations based on a disability is required to register with Disability Services and Programs (DSP) each semester. A letter of verification for approved accommodations can be obtained from DSP. Please be sure the letter is delivered to me as early in the semester as possible. DSP is located in GFS (Grace Ford Salvatori Hall) 120 and is open 8:30 a.m.–5:00 p.m., Monday through Friday.

Course Calendar

| # | Date | Session Topic and Agenda | Assignment |
|----|------------|--|--|
| 1 | 01/18/2021 | Holiday – no class | |
| 2 | 01/20/2021 | Course introduction and Overview | |
| 3 | 01/25/2021 | Discussion: What is technology strategy? Yin, Pai-Ling. “Strategy Reading: Technology Strategy.” HBS Core Curriculum, 2015 [8127-PDF-ENG] (Only Chapters 1 “Introduction”, 2.1. “What’s Different About Technology Strategy” and 2.3. “To lead or to Follow?”) (<i>course pack</i>) | |
| 4 | 01/27/2021 | Discussion: Technology trends - AI Agrawal, Ajay, Joshua Gans, and Avi Goldfarb, “Prediction Machines: The Simple Economics of Artificial Intelligence,” Harvard Business Review Press, 2018. Chapter 2 (pp. 16-17), 3 and 4 <i>Optional:</i> Brynjolfsson, Erik and Andrew McAfee. “The Second Machine Age”. Norton: New York, 2016, Chapters 1-3. | |
| 5 | 02/01/2021 | Case: Frank T. Rothaermel “Amazon.com, Inc.” 2015, [MH0031-PDF-ENG] (<i>course pack</i>) | List of team members due at the beginning of the class |
| 6 | 02/03/2021 | Discussion: The reduction in cost framework Agrawal, Ajay, Joshua Gans, and Avi Goldfarb, “Prediction Machines: The Simple Economics of Artificial Intelligence”. Harvard Business Review Press, 2018. Chapter 2 (pg 9-15). <i>Optional:</i> Brynjolfsson, Erik and Andrew McAfee. “The Second Machine Age”. Norton: New York, 2016, Chapter 4 and 9 (pg. 134-146). | |
| 7 | 02/08/2021 | Case: Jeffrey Rayport, Julia Kelly, Nathaniel Schwalb “The Powers That Be (Internet Edition): Google, Apple, Facebook, Amazon and Microsoft”, 2019 HBS case [818111-PDF-ENG] (<i>course pack</i>) | |
| 8 | 02/10/2021 | Discussion: Disruptive technologies “The Clayton M. Christensen Reader” by Clayton M. Christensen (15003-PDF-ENG) (Chapters “Disruptive Technologies: Catching the Wave” and “Meeting the Challenge of Disruptive Change”) (<i>course pack</i>) | |
| 9 | 02/15/2021 | Holiday – no class | |
| 10 | 02/17/2021 | Case: Sayan Chatterjee and Dennis Terez, “Tesla: Testing a Business Model at Its (R)evolutionary Best”, Ivey case, 2018 [W18126-PDF-ENG]. (<i>course pack</i>) | |
| 11 | 02/22/2021 | Case: Daniel Doiron and John Higgins, “General Motors and the Electric Car Revolution: Boom or Bust?”, Ivey case, 2019, [W19254-PDF-ENG]. (<i>course pack</i>) | |
| 12 | 02/24/2021 | Discussion: S-curves of technology adoption and diffusion Yin, Pai-Ling. “Strategy Reading: Technology Strategy.” HBS Core Curriculum, 2015 [8127-PDF-ENG] (Only sections “Growth” pg. 16-23 | |

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| | | and “Maturity pg. 23-24, and Chapters 2.4. “Strategies for New Markets” pg. 26-27 and 2.5. “Strategies for Existing Markets” pg. 27-31) (<i>course pack</i>) Agrawal, Ajay, Joshua Gans, and Avi Goldfarb. “Prediction Machines: The Simple Economics of Artificial Intelligence.” Harvard Business Review Press, 2018. Chapter 15. | |
| 13 | 03/01/2021 | Case: William R. Kerr; Allison M. Ciechanover; Jeff Huizinga; James Palano. “Autonomous Vehicles: The Rubber Hits the Road... but When?” HBS case, 2018 [818088-PDF-ENG]. (<i>course pack</i>) | Autonomous vehicle case memo due at the beginning of the class |
| 14 | 03/03/2021 | Class Exercise: Connecting the three frameworks (reduction in cost, disruption, s-curves) | |
| 15 | 03/08/2021 | Discussion: AI considerations – Data Agrawal, Ajay, Joshua Gans, and Avi Goldfarb, “Prediction Machines: The Simple Economics of Artificial Intelligence”. Harvard Business Review Press, 2018. Chapters 5 and 6. | |
| 16 | 03/10/2021 | Case: Russell Walker and Rafique Jiwani “Reinventing E-Commerce: Amazon’s Bet on Unmanned Vehicle Delivery”, 2015 [KEL911-PDF-ENG] (<i>course pack</i>) | Amazon case memo due at the beginning of the class |
| 17 | 03/15/2021 | Discussion: AI considerations – Human Capital Agrawal, Ajay, Joshua Gans, and Avi Goldfarb, “Prediction Machines: The Simple Economics of Artificial Intelligence,” Harvard Business Review Press, 2018. Chapters 7 and 11. | |
| 18 | 03/17/2021 | Case: William R. Kerr and Emer Moloney, “Vodafone: Managing Advanced Technologies and Artificial Intelligence”, HBS case, 2018 [318109-PDF-ENG] (<i>course pack</i>) | |
| 19 | 03/22/2021 | Discussion: Practical tools for developing an AI technology strategy Agrawal, Ajay, Joshua Gans, and Avi Goldfarb, “Prediction Machines: The Simple Economics of Artificial Intelligence.” Harvard Business Review Press, 2018. Chapters 12 and 13. | |
| 20 | 03/24/2021 | Class Exercise: The AI Canvas | |
| 21 | 03/29/2021 | Discussion: Implementing a technology strategy – breakthrough innovation and internal capabilities Yin, Pai-Ling. “Strategy Reading: Technology Strategy.” HBS Core Curriculum, 2015 [8127-PDF-ENG] (Only pg. 8-11) (<i>course pack</i>) Lynda M. Applegate and William R. Kerr, “Leading Breakthrough Innovation in Established Companies”, HBS Core Curriculum, 2016 [5272-PDF-ENG] (Chapters 1, 2.1. and 2.2) (<i>course pack</i>) | |
| 22 | 03/31/2021 | Case: Michael D. Watkins, Lisa Duke, Sonia Tan, Christopher Read, Rathan Kinhal, “NVIDIA: Winning the Deep-Learning Leadership Battle”, IMD case 2019 [IMD980-PDF-ENG] (<i>course pack</i>) | |
| 23 | 04/05/2021 | Discussion: Implementing a technology strategy – collaborating for innovation Lynda M. Applegate and William R. Kerr, “Leading Breakthrough Innovation in Established Companies”, HBS Core Curriculum, 2016 [5272-PDF-ENG] (Chapter 2.3) (<i>course pack</i>) | |

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| | | Case: Karim R. Lakhani, Wesley M. Cohen, Kynon Ingram, Tushar Kothalkar, Maxim Kuzemchenko, Santosh Malik, “Netflix: Designing the Netflix Prize (B), HBS case, 2014 [615025-PDF-ENG]. (<i>course pack</i>) | |
| 24 | 04/07/2021 | Wellness day – No class | |
| 25 | 04/12/2021 | Discussion: Implementing a technology strategy – commercialization Yin, Pai-Ling. “Strategy Reading: Technology Strategy.” HBS Core Curriculum, 2015 [8127-PDF-ENG] (only “Commercialization” section, pg. 12-15) (<i>course pack</i>) | |
| 26 | 04/14/2021 | Class Exercise: Developing a technology strategy from A to Z | |
| 27 | 04/19/2021 | Group presentations | Group project reports due at the beginning of the class |
| 28 | 04/21/2021 | Group presentations | |
| 29 | 04/26/2021 | Group presentations | |
| 30 | 04/28/2021 | Course wrap-up (includes a discussion about broader strategic implications, policy and society) | |