USC Marshall School of Business

MOR 458: Technology Strategy: The Case of AI
Location TBD
4 units: 1hr 50min twice weekly
Spring 2022

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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 *strategy approaches to managing technology in business* – sets of choices about if and how to use new technology as a strategic business consideration. The focus on *new technologies* is essential because what matters from a competitive strategy perspective is *technological change*: technology carries the promise of making a strategic impact as long as not all businesses use the same technology.

The most recent technological wave, artificial intelligence (AI), is poised to infiltrate all industries and markets. How can frontier AI technologies add value to an organization in the short- and the long-run? How should organizations invest their resources today to best position themselves for tomorrow? Technology strategy provides the tools necessary to make such decisions.

Developing a technology strategy implies 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.

LEARNING OBJECTIVES

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

1. Explain the fundamental characteristics of an AI technology strategy.
2. Appraise the potential impact of the new technological wave.
3. Analyze the main structural features of a company with respect to the actual and potential impact of AI technologies.
4. Analyze the main structural features of an industry with respect to the actual and potential impact of AI technologies.
5. Explain the different aspects of technology development and evolution that need to be considered when formulating an AI technology strategy.
6. Evaluate the implications of getting engaged in technological innovation relative to being solely a technology consumer.
7. Perform a high-level AI technology strategic analysis that demonstrate an understating of the main factors that need to be considered and the relationships between them.
8. Provide a thoughtful critique of others' arguments, analyses and supporting evidence.
9. 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: **TBD**
- 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:

Assignments	***Points***	***% of Overall Grade***
Class Participation	*15*	*15%*
Case memo independent assignment 1 (Autonomous vehicles)	*15*	*15%*
Case memo independent assignment 2 (Vodafone)	*15*	*15%*
Team project written report	*20*	*20%*
Team project oral discussion	*10*	*10%*
Final exam	*25*	*25%*
TOTAL	*100*	*100%*

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 in class—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.

Course Calendar

#	Date	Session Topic and Activities	Assignment & Due Date
1		**Course introduction and Overview**	
2		**Discussion: What is AI?**	
3		**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?") *(course pack)*	
4		**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 *Optional:* Brynjolfsson, Erik and Andrew McAfee. "The Second Machine Age". Norton: New York, 2016, Chapters 1-3.	
5		**Case:** Frank T. Rothaermel "Amazon.com, Inc." 2015, [MH0031-PDF-ENG] *(course pack)*	List of team members due at the beginning of the class
6		**Discussion: Tech strategy classic insights - Disruptive technologies and first mover** "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") *(course pack)*	
7		**Discussion: Tech strategy classic insights - 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 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) *(course pack)*	
8		**Case:** Sayan Chatterjee and Dennis Terez, "Tesla: Testing a Business Model at Its (R)evolutionary Best", Ivey case, 2018 [W18126-PDF-ENG]. *(course pack)*	
9		**Case:** Daniel Doiron and John Higgins, "General Motors and the Electric Car Revolution: Boom or Bust?", Ivey case, 2019, [W19254-PDF-ENG]. *(course pack)*	
10		**Guest speaker TBD**	
11		**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).	

		Optional: Brynjolfsson, Erik and Andrew McAfee. "The Second Machine Age". Norton: New York, 2016, Chapter 4 and 9 (pg. 134-146).	
12		**Discussion: AI strategic complements/substitutes – Data** Agrawal, Ajay, Joshua Gans, and Avi Goldfarb, "Prediction Machines: The Simple Economics of Artificial Intelligence". Harvard Business Review Press, 2018. Chapters 5.	
13		**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]. *(course pack)*	Autonomous vehicle case memo due at the beginning of the class
14		**Discussion: AI strategic complements/substitutes – 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.	
15		**Case:** Russell Walker and Rafique Jiwani "Reinventing E-Commerce: Amazon's Bet on Unmanned Vehicle Delivery", 2015 [KEL911-PDF-ENG] *(course pack)*	
16		**Class Exercise:** Connecting classic tech strategy insights with AI specific insights	
17		**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.	
18		**Class Exercise:** The AI Canvas	
19		**Case:** William R. Kerr and Emer Moloney, "Vodafone: Managing Advanced Technologies and Artificial Intelligence", HBS case, 2018 [318109-PDF-ENG] *(course pack)*	Vodafone case memo due at the beginning of the class
20		**Discussion: AI strategy consideration – GPTs & value creation/value capture:** Agrawal, Ajay, Joshua Gans, and Avi Goldfarb. "Prediction Machines: The Simple Economics of Artificial Intelligence." Harvard Business Review Press, 2018. Chapter 15.	
21		**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) *(course pack)* 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) *(course pack)*	
22		**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) *(course pack)*	
23		**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] *(course pack)*	

24		**Class Exercise:** Developing a technology strategy from A to Z	
25		**Discussion: AI risks & trade-offs:** Agrawal, Ajay, Joshua Gans, and Avi Goldfarb. "Prediction Machines: The Simple Economics of Artificial Intelligence." Harvard Business Review Press, 2018. Chapters 16 and 17.	
26		**Discussion: AI risks & trade-offs:** Agrawal, Ajay, Joshua Gans, and Avi Goldfarb. "Prediction Machines: The Simple Economics of Artificial Intelligence." Harvard Business Review Press, 2018. Chapters 18 and 19.	
27		**Guest speaker TBD**	
28		Group presentations	Group project reports due at the beginning of the class
29		Group presentations	
30		Course recap and discussion	
31		Final Exam	

Statement on Academic Conduct and Support Systems

Academic Conduct:

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" policy.usc.edu/scampus-part-b. Other forms of academic dishonesty are equally unacceptable. See additional information in SCampus and university policies on Research and Scholarship Misconduct.

Students and Disability Accommodations:

USC welcomes students with disabilities into all of the University's educational programs. The Office of Student Accessibility Services (OSAS) is responsible for the determination of appropriate accommodations for students who encounter disability-related barriers. Once a student has completed the OSAS process (registration, initial appointment, and submitted documentation) and accommodations are determined to be reasonable and appropriate, a Letter of Accommodation (LOA) will be available to generate for each course. The LOA must be given to each course instructor by the student and followed up with a discussion. This should be done as early in the semester as possible as accommodations are not retroactive. More information can be found at osas.usc.edu. You may contact OSAS at (213) 740-0776 or via email at osasfrontdesk@usc.edu.

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 – 24/7 on call
suicidepreventionlifeline.org

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 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 for Equity, Equal Opportunity, and Title IX (EEO-TIX) - (213) 740-5086
eeotix.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.

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 for Equity, Equal Opportunity, and Title for appropriate investigation, supportive measures, and response.

The Office of Student Accessibility Services (OSAS) - (213) 740-0776
osas.usc.edu
OSAS ensures equal access for students with disabilities through providing academic accommodations and auxiliary aids in accordance with federal laws and university policy.
USC Campus Support and Intervention - (213) 821-4710
campussupport.usc.edu
Assists students and families in resolving complex personal, financial, and academic issues adversely affecting their success as a student.

Diversity, Equity and Inclusion - (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, 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 the Ombuds - (213) 821-9556 (UPC) / (323-442-0382 (HSC)
ombuds.usc.edu
A safe and confidential place to share your USC-related issues with a University Ombuds who will work with you to explore options or paths to manage your concern.

*Occupational Therapy Faculty Practice - (323) 442-33*40 or otfp@med.usc.edu
chan.usc.edu/otfp
Confidential Lifestyle Redesign services for USC students to support health promoting habits and routines that enhance quality of life and academic performance.

Appendix I

USC Marshall
School of Business

Undergraduate Program Learning Goals and Objectives (last update 12/21/17)

Learning goal 1: Our graduates will demonstrate critical thinking skills *so as to become future-oriented problem solvers, innovators and decision makers in diverse and rapidly changing business environments.*

- Students will demonstrate the ability to anticipate, identify and solve business problems. They will be able to identify and assess central problems, identify and evaluate potential solutions, and translate a chosen solution to an implementation plan that considers future contingencies
- Students will demonstrate the ability to be accurate, clear, expansive (thorough, detailed) and fair-minded in their thinking
- Students will critically analyze concepts, theories and processes by stating them in their own words, understanding key components, identifying assumptions, indicating how they are similar to and different from others and translating them to the real world
- Students will be effective at gathering, storing, and using qualitative and quantitative data and at using analytical tools and frameworks to understand and solve business problems
- Students will understand the concepts of critical thinking, entrepreneurial thinking and creative thinking as drivers of innovative ideas

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Learning Goal 2: Our graduates will develop people and leadership skills to promote their effectiveness as *business managers and leaders in the 21st century's evolving work and organizational structures.*

- Students will recognize, understand and analyze the roles, responsibilities and behaviors of effective managers and leaders in diverse business contexts e.g., functionally diverse, culturally diverse, geographically diverse, etc.
- Students will understand factors that contribute to effective teamwork including how to elicit, manage and leverage diverse perspectives and competencies.
- Students will recognize, understand, and analyze the motivations and behaviors of stakeholders inside and outside organizations (e.g., teams, departments, consumers, investors, auditors)

Learning Goal 3: Our graduates will be effective communicators *to facilitate information flow in organizational, social, and intercultural contexts.*

- Students will identify and assess diverse personal and organizational communication goals and audience information needs
- Students will demonstrate an ability to gather and disseminate information and communicate it clearly, logically, and persuasively in professional contexts
- Students will understand individual and group communications patterns and dynamics in organizations and other professional contexts

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Learning goal 4: Our graduates will demonstrate ethical reasoning skills, understand social, civic, and professional responsibilities *and aspire to add value to society.*

- Students will recognize ethical challenges in business situations and assess appropriate courses of action
- Students will understand professional codes of conduct

Learning goal 5: Our graduates will develop a global business perspective. They will understand how local, regional, and international markets, and economic, social and cultural issues impact business decisions *so as to anticipate new opportunities in any marketplace.*

- Students will understand that stakeholders, stakeholder interests, business environments (legal, regulatory, competitor) and business practices vary across regions of the world
- Students will understand how local, regional and global markets interact and are impacted by economic, social and cultural factors.

Learning goal 6: Our graduates will understand types of markets and key business areas and their interaction *to effectively manage different types of enterprises.*

- Students will demonstrate foundational knowledge of core business disciplines, including business analytics and business economics
- Students will understand the interrelationships between functional areas of business so as to develop a general perspective on business management
- Students will apply theories, models, and frameworks to analyze relevant markets (e.g. product, capital, commodity, factor and labor markets)
- Students will be able to use technologies (e.g., spreadsheets, databases, software) relevant to contemporary business practices