



**The Strategic Management of AI (MGMT-GB 2105)**  
**Fall 2019**

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## COURSE OVERVIEW

Artificial intelligence (AI) has been advancing rapidly in recent years, measured both in terms of the amount of resources devoted to it and also in terms of its outputs.<sup>1</sup> *The Economist* estimated that AI-related mergers and acquisitions were 26 times larger in 2017 than in 2015.<sup>2</sup> Increased investment has been driven by and also contributed to rapid increases in the technical capabilities of AI. For example, according to the AI Index, error rates for image recognition has dropped from 29 percent to less than 3 percent between 2010 and 2017, surpassing human performance levels.<sup>3</sup> These rapid advancements apply not just AI, but also to robotics, sensors, and the connection of them all via digitization (also known as “Industry 4.0”). These advancements have started to manifest themselves in a variety of applications, including AI beating humans at complex strategy games,<sup>4</sup> the creation of chatbots and virtual assistants such as Alexa and Siri,<sup>5</sup> and Amazon’s new cashier-less and cash-less grocery stores.<sup>6</sup>

But, what does all this mean for managers?

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<sup>1</sup> Artificial Intelligence is a loosely describes a range of advanced technologies that incorporate a human-like learning ability, including machine learning (ML), autonomous robotics and vehicles, computer vision, language processing, virtual agents and neural networks.

<sup>2</sup> <https://www.economist.com/news/leaders/21739658-artificial-intelligence-pushes-beyond-tech-industry-work-could-become-fairer-or-more>

<sup>3</sup> AI Index, November 2017; available: <https://aiindex.org/2017-report.pdf>

<sup>4</sup> For example, in February 2016, Google’s DeepMind used its AI to beat Korean Go master Lee Se-dol

<https://www.nytimes.com/2016/03/10/world/asia/google-alphago-lee-se-dol.html> and in January 2017, an AI system called DeepStack beat humans at the complex poker game Texas Hold ‘Em <https://www.scientificamerican.com/article/time-to-fold-humans-poker-playing-ai-beats-pros-at-texas-hold-rsquo-em>

<sup>5</sup> <https://www.theatlantic.com/technology/archive/2011/10/siri-the-perfect-robot-for-our-time/246516/>

<sup>6</sup> <https://www.nytimes.com/2018/01/21/technology/inside-amazon-go-a-store-of-the-future.html>

This course will take the manager's perspective. Familiarity with any new technology is an important goal for managers, so that competitive and corporate strategies can be aligned to take advantage of potential new opportunities and guard against potential risks. But new technologies don't appear in a vacuum. They are commercialized against a backdrop of macro-economic trends and cultural norms, and their adoption may depend on these factors as well as industry-specific and firm-specific factors. For example, a firm's relationship with its employees may have direct consequences for decision to adopt a new technology, or the manner in which a new technology is adopted. This course will provide you with a set of strategy and management frameworks that firms use when assessing how to implement AI in their own organizations, how to use AI as a competitive tool in the marketplace, and how to interact with government regulators.

To accomplish these goals, we will use a variety of popular press readings, academic research papers, cases and in-class presentations. To be successful in this course, you must spend time actively and rigorously thinking about the details of the given cases and relate your thoughts to the big picture.

## COURSE REQUIREMENTS

### **Readings**

There will be a relatively heavy reading load for the class, including cases, academic research papers, popular press, and other. These will be available via a digital course pack (on the HBS Publishing website) or on the NYU Classes website. You are expected to prepare for each class by completing the assigned reading and thinking carefully through any preparation questions (in addition to completing any assignments). The best managers are those that can read and assimilate lots of material, so think of this as good training for your future career.

### **Grading**

Apart from teaching you the ability to think sharply, graduate education helps you in your professional development by requiring you to speak and write in a logical and compelling manner, and by broadening your professional networks. Accordingly, I have created assignments and a grading system which reinforces these benefits of graduate education. However, you are responsible for a large portion of your own development. You are required not only to attend classes, but also to carefully prepare for each class and contribute actively to classroom discussions. Active contribution not only aids your development, but that of your peers.

Your overall grade for the class will depend on three elements as follows.

1. Class participation	30%
2. Three group case write-ups (10% X 3)	30%
3. Spectrum position piece	10%
4. Group project and presentation	30%

### ***1. Class attendance and participation (30%)***

You should be prepared to share your ideas and critically interpret the perspectives presented by others. Please carefully review the readings and case preparation questions for every class session. Quantity of participation, if lacking in quality, will not be rewarded. The chief criterion for this part of the grade is student's contribution to the learning of others. Accordingly, quality participation has one or more of the following characteristics:

- *Courtesy*: Respecting and observing the rules of the game and the rights and dignity of your classmates; limiting participation to a fair share.
- *Coherence*: Providing careful analysis and turning vague ideas into precise statements; integrating experiences and learning material with class-room discussion.
- *Cleverness*: Quick and deep thinking; ability to abstract and infer; contributing ideas that you would not have come across; providing new ways of looking at the world.
- *Courage*: Willingness to take risks by espousing unpopular ideas, challenging authority, asking good questions.
- *Character*: Special personal attributes, such as a sense of humor or a supportive personality, placed in the service of the class.

You are responsible for actively participating in class. I reserve the right to cold call and will use it to move discussion along, not to intimidate or create a hostile environment. If, for some reason, you are unprepared for any section, let me know before class and I will not cold call you during that session. I have listed a set of preparation questions for each session below to guide your thinking while reading. Please come prepared to answer these questions in class.

### ***2. Case write-ups (30%)***

The short assignments include three case based write-ups to be turned in by your group (each counts for 10%). Assignments are due in hard-copy at the start of the class during which we will discuss the case. Write-ups should be no longer than TWO single-spaced typed pages with 12-point font and one inch margins, and should answer only the question(s) indicated below under the corresponding session's readings. You should not consult outside materials, but instead rely only on the material provided in the case. Figures and Tables can be used to supplement the text and do not count toward the page limit. Please turn in one hard copy of each assignment per group and clearly list the names of each group member on the cover page.

### **3. *Spectrum position piece (10%)***

We will read several government documents related to a brewing battle over the use of scarce wi-fi spectrum that is valued by firms in the automotive space on the one hand, and wireless carriers on the other. Your group will then be assigned to take the viewpoint of one of these firms, and produce a write up that succinctly and forcefully argues your position. As with the case write-ups, this document should be no longer than TWO single-spaced typed pages with 12-point font and one inch margins. More details on this assignment will be provided in class.

### **4. *Final group project (30%)***

You will work with your group to prepare one group strategy project and presentation. Write a FIVE page paper (single-spaced, 12-point font and one inch margins; as many exhibits as needed) and prepare a slide deck (*PowerPoint, <=7 slides*). More detail on the project will be provided in class.

I expect you to cite any data that you draw on other than class material, and go beyond assembling facts and figures from the sources. Your grade for this submission will be based on the paper. All members of a group will receive the same points on the assignment, but if you strongly feel that any of your group's members should be treated differently, please let me know.

## **Classroom Policies**

- Laptops, Smartphones, and Other Electronic Devices: You may use laptops in class to access slides and take notes, but not for anything un-related to class.
- Attendance and Lateness: Attendance is required and part of the participation grade. Late arrival or early exit will hamper your ability to learn the material, impact your grade through missed participation opportunities, and disrupt the flow of the class. In the case of unavoidable absences, please try to notify me ahead of time.
- Seating assignments: There are no assigned seats in class. In fact, I suggest you sit in a different place, next to a different person, each class. I intentionally build in time for in-class exercises every class to give you a chance to network with your colleagues. The best way to take advantage of this is to sit next to someone you *don't* know well each class.
- Make-up assignments and classes: Requests for make-up assignments or classes will not be entertained. If you miss class, use the slides and class video to catch up.

## **ACADEMIC INTEGRITY**

You should not consult the Internet, friends at other business schools, or people who have taken the course already for any of the assignments.

In the context of this course, it is acceptable to refer to concepts, frameworks, and analytical tools from the readings or class lectures without citation. You may also refer to the case material without citation. However, do not quote or paraphrase analysis from another source and present it as your own.

The consequences of cheating can be failing an assignment or the course, or suspension or dismissal from the university. Please remember that you are governed by the MBA Honor Code. Moreover, every student is obligated to report any suspected violation of that code.

## **STUDENTS WITH DISABILITIES**

If you have a qualified disability and will require academic accommodation during this course, please contact the Moses Center for Students with Disabilities (CSD, 998-4980) and provide me with a letter outlining recommended accommodations.

## SCHEDULE OF COURSE READINGS AND ASSIGNMENTS

*This following is a guideline only; Instructor reserves the right to change assignment questions, schedule, and other readings as necessary.*

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### SESSION 1: Overview of AI and Current Macro-economic and Cultural Trends

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**Key questions:**

- What do people mean when they use the term “AI”?
- How might the current macroeconomic trends (including labor force participation and competition policy) and cultural trends influence adoption and use of AI?

**Required reading:**

- Furman and Seamans. 2019. “AI and the Economy” *NBER Innovation Policy and the Economy*.
- Agrawal, A., Gans, J. and Goldfarb, A., 2016. “The simple economics of machine intelligence.” *Harvard Business Review*, November 17. Available: <https://hbr.org/2016/11/the-simple-economics-of-machine-intelligence>

**Class preparation questions (think about these before class):**

1. How would you define “artificial intelligence”?
2. How might the declining labor force participation rate in the US affect adoption of AI?
3. How might decreasing competition (itself a contentious subject) affect adoption of AI?
4. How might declining trust in the government affect adoption of AI?

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### SESSION 2: AI in the Firm: The Role of Management Practices

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**Assignment: USPTO case write up due****Key questions:**

- What enables and constrains AI adoption at the firm level?
- How do differences in management practices affect the decision to adopt AI?
- How do competition, industry structure, and other factors affect the decision to adopt AI?

**Required reading:**

- HBS Case: The Future of Patent Examination at the USPTO (617-027)
- Leta-Jones, M. and K. Levy. 2018. “Sporting Chances: Robot Referees and the Automation of Enforcement” Cornell working paper.

**Case consideration questions (think about these before class):**

1. Should Congress extend the telework program TEAAP? What are the pros and cons?
2. Under what conditions would you implement a Work From Anywhere (WFA) policy in your organization?

**Case write-up question (answer this in your write-up):**

3. Are ML tools a threat or opportunity for individual patent examiners? Based on their prior backgrounds, which examiners would benefit more from using a ML search tool?

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**SESSION 3: AI, Data and a Firm's Customers: Managing Bias and Privacy**

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**Assignment: Airbnb case writeup due**

**Key questions:**

- How does AI affect interactions between firm and individuals, either customers or employees?
- How can AI exacerbate bias and discrimination?
- How can managers use AI to handle bias and discrimination?
- How should the firm manage customer (another firm or individual) privacy?

**Required reading:**

- HBS Case: Airbnb (912-019)
- Luca, Michael, Jon Kleinberg, and Sendhil Mullainathan. “Algorithms Need Managers Too,” *Harvard Business Review* Vol. 94, No. 1 (January–February 2016): 96–101. Available: <https://hbr.org/2016/01/algorithms-need-managers-too>
- Athey, S., Catalini, C. and Tucker, C., 2017. “The digital privacy paradox: small money, small costs, small talk” National Bureau of Economic Research (No. w23488). Available: <https://www.nber.org/papers/w23488.pdf>

**Case consideration questions (think about these before class):**

1. How will AI affect trust between firms and their customers?
2. Is there anything Airbnb could have done to avoid the “EJ” incident or reduce the aftermath?

**Case write-up questions (answer these in your write-up):**

3. How should Airbnb further facilitate trust between renters and hosts?
4. How should Airbnb's reputation system differ from that of eBay?

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## **SESSION 4: AI and a Firm’s Regulators: Managing Firm-Government Interactions**

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**Assignment: GM case write-up due**

**Key question:**

- How should a firm and its managers interact with the government to push for AI policy?
- What is the appropriate way to manage industry consortia or other third parties advocating for AI policy?

**Required reading:**

- HBS Case: General Motors and Autonomous Vehicle Regulations
- Zach Graves’s overview of Congress’ Office of Technology Assessment

**Case consideration questions (think about these before class):**

1. Should General Motors attempt to shape the legislation or influence the timing of its implementation? What would be the desired regulatory outcomes?

**Case write-up question (answer these in your write-up):**

2. Is the pending federal regulation likely to be good or bad news for GM?
3. Should GM adopt a gradual (ie, level-3 first) or full-automation approach?

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## **SESSION 5: AI and Firm Competition and Cooperation: Spotlight on Convergence**

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**Assignment: Spectrum position piece. Your group will be assigned to either “wireless carriers” or “auto manufacturers.” More detail to be provided.**

**Key questions:**

What defines the technology “this time” versus in the past?

How is technology blurring industry boundaries?

[Deeper dive] What are the battle lines that are being drawn in spectrum?

**Required reading:**

- Spectrum readings from DOT, NTIA, FCC, and public Federal Register filings.

**Case assignment questions:**

1. Each group will be provided separate questions.

## **SESSION 6: Wrap Up and Group Project Presentations**

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**Assignment: Group Project paper and presentations due. Presentations will occur in class.**

## OTHER READINGS ON AI

The following are books and articles I have found directly or indirectly related to the issues we will discuss in class. These are not required for class and are purely recommendations in case you are interested.

### Books

Agrawal, A., Gans, J. and Goldfarb, A., 2018. *Prediction Machines: The simple economics of artificial intelligence*. Harvard Business Press.

Broussard, Meredith. 2018. *Artificial Unintelligence: How Computers Misunderstand the World*. MIT Press

Brynjolfsson, E. and McAfee, A., 2012. *Race against the machine: How the digital revolution is accelerating innovation, driving productivity, and irreversibly transforming employment and the economy*. MIT Press.

Lee, Kai-Fu Lee, 2018. *AI Superpowers: China, Silicon Valley, and the New World Order*. Houghton Mifflin.

Lowrey, A., 2018. *Give People Money: How A Universal Basic Income Would End Poverty, Revolutionize Work, and Remake the World*.

Marcus G. 2019. *Rebooting AI: Building Artificial Intelligence We Can Trust*. Pantheon Press.

Sundararajan, A., 2016. *The sharing economy: The end of employment and the rise of crowd-based capitalism*. MIT Press.

West, Darrell M. 2018. *The Future of Work: Robots, AI, and Automation*. Brookings Institution Press, 2018.

### Articles

Cowgill, B., 2016. The Labor Market Effects of Hiring through Machine Learning. Columbia University working paper.

Provost, F., and Euchner, J. 2017. “What managers need to know about big data,” *Research-Technology Management* **60**(3): 11-17.