95-722 - Digital Transformation

Carnegie Mellon University

Masters of Information Systems Management Program

Fall 2017, Mini 1

Instructor:
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Office Hours: I have an open door policy. For quick topics, feel free to e-mail or call; I will do my best to respond quickly. If you would like to talk in person, feel free to drop by or e-mail me to make an appointment. (I'm in the office most days Monday-Thursday.)

Faculty Assistant:

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Course Information:

Section A	Section B	Section C
TuTh 9:00-10:20	TuTh 10:30-11:50	TuTh 1:30-2:50
HBH 2008	HBH 2008	HBH 2008

Classroom: August 29 – October 12
Take-Home Final Exam: Due midnight October 19

Course Objectives:

This course serves as the capstone course for the MISM program. As a capstone, the goal is to integrate technological and managerial aspects of information technology. Information and communication technologies play multiple roles within businesses, organizations, industries, and societies:

- From a ***technological perspective***, they define the information and communication infrastructure of the entity and they enable new ways to digitize processes.

- From a ***managerial perspective***, they facilitate new coordination and communication within and across entities, enable new organizational forms, change the information environment underlying the business, and permit new incentive and monitoring structures.

Successful efforts at digitization have to keep both technological and managerial perspectives in mind. Using a mix of managerial theory and case analysis, this course will study how the deployment of information technology changes interactions and processes within organizations, across organizations, within industries, and across society.

Given this environment, the course has the following key learning objectives:

- Enable students to evaluate the likely impact of future IT innovations on their firm and industry.
- Identify key drivers of technology's impact on the business ecosystem.
- Formulate appropriate frameworks to categorize technological innovation and its impact along a variety of metrics including competitive environment, business model disruption, and supply chain structure.
- Develop business communication skills to effectively communicate recommendations in both written and spoken forms.

The case analyses will require students to engage in both technical and managerial problem solving. The technical component of the analysis requires students to understand IT architectures for the problems highlighted in the case. The managerial component of the analysis requires students to analyze the business value and managerial impact of IT, and to address the change management issues that arise in implementing any digital transformation initiative.

Recording of Classroom Activities:

My policy on recording classroom activities is that no student may record or tape any classroom activity without my express written consent. If a student believes that he/she is disabled and needs to record or tape classroom activities, I would be happy to work with the Office of Disability Resources to provide an appropriate accommodation.

Cheating, Plagiarism, and Academic Integrity:

Students at CMU are engaged in preparation for professional activity of the highest standards. Each profession constrains its members with both ethical responsibilities and disciplinary limits. To assure the validity of the learning experience, Carnegie Mellon establishes clear standards for student work. You are required to be familiar with all university policies on this subject (see http://www.cmu.edu/policies/documents/Cheating.html). A portion of these policies is reproduced here for emphasis:

> In any presentation, creative, artistic, or research, it is the ethical responsibility of each student to identify the conceptual sources of the work submitted. Failure to do so is dishonest and is the basis for a charge of cheating or plagiarism, which is subject to disciplinary action.
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> Cheating includes but is not necessarily limited to:
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> - Plagiarism, explained below.
> - Submission of work that is not the student's own for papers, assignments or exams.
> - Submission or use of falsified data.
> - Theft of or unauthorized access to an exam.
> - Use of an alternate, stand-in or proxy during an examination.
> - Use of unauthorized material including textbooks, notes or computer programs in the preparation of an assignment or during an examination.
> - Supplying or communicating in any way unauthorized information to another student for the preparation of an assignment or during an examination.
> - Collaboration in the preparation of an assignment. Unless specifically permitted or required by the instructor, collaboration will usually be viewed by the university as cheating. Each student, therefore, is responsible for understanding the policies of the department offering any course as they refer to the amount of help and collaboration permitted in preparation of assignments.
> - Submission of the same work for credit in two courses without obtaining the permission of the instructors beforehand.
>
> Plagiarism includes, but is not limited to, failure to indicate the source with quotation marks or footnotes where appropriate if any of the following are reproduced in the work submitted by a student:
>
> - A phrase, written or musical.
> - A graphic element.
> - A proof.
> - Specific language.
> - An idea derived from the work, published or unpublished, of another person.

Regarding plagiarism, you should also familiarize yourself with the content of the separate handout entitled "A Note on Plagiarism and Citing Sources."

I also wish to inform you that I make use of plagiarism detection tools provided by the University.

One application of this plagiarism policy for our class is that you may not provide or receive information on case write-ups from students outside of your project team. This includes both students from prior semesters and students from other project teams in this semester.

If you believe that a classmate is engaged in an academic integrity violation, you may report that violation to me (the instructor), the TA, or if you prefer you can anonymously report violations to Carnegie Mellon's "Ethics Reporting Hotline" at 877-700-7050 (for more information, see: http://www.cmu.edu/hr/eos/forms/carnegie_mellon_hotline_poster.pdf).

Course Web Site:

Web: https://cmu.instructure.com/courses/682

We will use the Canvas for course information and announcements. If you are registered in the class you should already have access. Your login id is your andrew id and password.

If you are on the wait list, you should still be able to access the site with your Andrew login (with the exception of the student's resources section). If this does not work, please e-mail the teaching assistant for your section to obtain temporary access.

The web site has an up-to-date copy of the syllabus, schedule, and any class announcements. While I will try to make announcements both in class and on the web site, it is a good idea for you to check the web site regularly. Additionally, the web site has links to class readings and relevant sites mentioned in class and more extensive background material.

Reading Materials:

A "digital" reading packet containing most of the cases and readings for this course is available from HBS Publishing at:

http://cb.hbsp.harvard.edu/cbmp/access/56289955

You should have received an email from Harvard with details and a link to a set of HBS case studies. If you did not receive this email, please send an email to the TA for your section.

Supplemental readings are available on Canvas or will be distributed in class.

Grading and Course Requirements:

You will be evaluated on the basis of your case analyses, in-class discussions, and an individual final exam assignment handed out at the end of the mini. Your case analyses will be graded as group work. Your grades for the final exam and in-class contribution will be your own.

The final grade for the course is distributed among various assignments and activities as follows:

1. Class Learning Contribution: 30%
2. Case Analysis: 45%
3. Final Exam: 25%

Class Learning Contribution: The quality of our learning environment is contingent on the effective and informed participation of each class member. The goal here is not to dazzle us with your individual brilliance or with the number of comments you make, but rather to help make the class smarter. Note that, in addition to providing new insights to the discussion, it is possible to make the class smarter by asking the right question or by assimilating comments from other students or sources. It is also possible to contribute to the class by giving a short presentation related to your professional experience as it relates to the class material (such presentations should be discussed with me in advance).

In addition, I will try to close each class by asking for someone to summarize the key "takeaways" of today's class. Answering this question well is another opportunity to contribute to our discussion.

The case analyses are designed to help you participate in an effective manner in class. The quality of your comments and your ability to build on and respond to threads in a conversation about a particular issue will be taken into account in assigning your participation grade.

It is important to note that class contribution is assessed on an individual basis. This is inherently a subjective assessment but will take the following factors into account:

   a. Preparation.
   b. Ability to coherently present arguments and to contribute to a discussion.
   c. Ability to influence and persuade others in class to agree with your opinions.

Because of the importance of contribution to both your learning and your classmates' learning, *I am requiring you to turn off your laptops and other electronic devices (tablets, cell phones, etc.) during class and will take your compliance into account when assigning contribution grades*. If you have a unique situation that necessitates the use of a laptop during class, please contact me beforehand.

The reason I plan to reduce contribution scores for people who persist in using electronic devices in class is that recent research suggests your electronics use can have a negative impact on those around you. Consider this quote from a paper titled "Laptop multitasking hinders classroom learning for both users and nearby peers":

> *We found that participants who multitasked on a laptop during a lecture scored lower on a test compared to those who did not multitask, and participants who were in direct view of a multitasking peer scored lower on a test compared to those who were not. The results demonstrate that multitasking on a laptop poses a significant distraction to both users and fellow students and can be detrimental to comprehension of lecture content.[1]*

Case Analysis: You case analysis grade is based on a 2-page write-up (double-spaced, 12-point font, 1 inch margins). You case submission is **due to Canvas by midnight the day before the case is discussed in class**.

I will also assign groups to present their recommendations to the class. Your write-up and presentation should address the issues raised in the case narrative and discussion questions. Case analysis assignments are group work and I expect that each group member will be involved in the output and analysis.

Teams assigned to present their analysis should limit their presentation to 15 minutes of prepared comments, with an additional 10 minutes of question and answer time from the class. The team should include enough backup material (including slides) to answer any questions that might arise about your recommendations.

Final Exam: There will be a take home final exam. The exam will ask you to integrate information we have learned across the cases we covered in the semester. The exam will be handed out on the last day of class and will be due a week later on October 19.

Peer Review: Since the case analyses are group work, I will use a peer review instrument to ensure that I take into account feedback from each group member about their fellow teammates' contribution when I assign the final grade.

A Note on Regrade Requests: We make every effort to return graded assignments within 1 week of their submission. If you believe that your grade is inaccurate, you may request a regrade under the following conditions:

1. Regrade requests must be submitted within 1 week of the date when the grade was returned.

2. Regrade requests must be in writing and must include a copy of the original assignment.

3. Regrade requests must outline the reasons you deserve a higher grade. These will typically be that the grader misread or misunderstood your answer, or didn't take something into account that they should have. For this, you should use the written comments on the assignment as your reference point. Referencing another student's grade is inappropriate and irrelevant. While we do our best to apply an even standard across students, we can't discuss anyone else's grade with you, so we need to deal with the merits of your particular case.

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[1] Source: http://www.sciencedirect.com/science/article/pii/S0360131512002254.

4. I reserve the right to regrade the entire assignment and thus your grade may go up or down.

5. Class contribution grades are inherently subjective and not subject to a regrade request. I will make notes on participation at the end of each class and assign grades at the end of the semester based on these notes. I am, however, more than happy to discuss your progress in terms of class contribution at any point in the semester.

Take care of yourself:

Do your best to maintain a healthy lifestyle this semester by eating well, exercising, avoiding drugs and alcohol, getting enough sleep and taking some time to relax. This will help you achieve your goals and cope with stress.

All of us benefit from support during times of struggle. You are not alone. There are many helpful resources available on campus and an important part of the college experience is learning how to ask for help. Asking for support sooner rather than later is often helpful.

If you or anyone you know experiences any academic stress, difficult life events, or feelings like anxiety or depression, I strongly encourage you to seek support. I would be more than happy to talk to you about any issues you are having, either related to the class or simply related to your life here at CMU. You can also reach out to a friend, faculty or family member you trust for guidance getting connected to the support that can help, or use CMU's Counseling and Psychological Services (CaPS) (412-268-2922, http://www.cmu.edu/counseling/).

Course Schedule:

This schedule is subject to change during the semester. All changes will be announced in class or posted to Canvas.

Unless otherwise announced, all assignments are due to Canvas by midnight the night before the assignment is discussed in class. There is a 10% penalty for late assignments. No assignments are accepted after the start of the 9:00AM class on the day of discussion.

Readings marked with: (HBS) are in the reading pack available from the Harvard Business School Publishing website. Readings marked with (Canvas) are available on Canvas.

August 29 — Introduction: I will briefly review the course objectives and student expectations we will use during the mini. The objective of the course is to engage you in analytical thinking regarding important information technology management issues. You will combine your knowledge of information technology, decision-making, strategy and data analysis in these case analyses and discussions. There will be no lectures *per se* in this course beyond a few professor-led discussions to provide a set of analytic frameworks. You will be tasked with preparing cases and evaluated on the quality of your participation and analysis.

Recommended Articles
- "How to Talk in Meetings When you Hate Talking in Meetings," Dana Rousmaniere, Havard Business Review, April 21, 2016. (https://hbr.org/2016/04/how-to-talk-in-meetings-when-you-hate-talking-in-meetings)
- "The Plagiarism Spectrum," Turnitin.com. (http://turnitin.com/assets/en_us/media/plagiarism-spectrum/)
- "Why I Just Asked My Students To Put Their Laptops Away," Clay Shirky, Blog Post. (https://medium.com/@cshirky/7f5f7c50f368)

Module 1: Frameworks for Digital Transformation

August 31 — What is Digital Transformation: In this class we will discuss why understanding "Digital Transformation" is important for future IT leaders, including its conceptual origins, what questions it raises for managers, and the cases and topics we will use in this class to illustrate these concepts. We will also discuss my expectations for case write-ups prior to our first case next week.

Required Articles
- "Winning the Race with Ever Smarter Machines," Andrew McAfee and Erik Brynjolfsson, Sloan Management Review, Winter 2012, pp. 53-60. (HBS)
- "The Digitization of Just About Everything," Andrew McAfee and Erik Brynjolfsson, Rotman Management Magazine, Fall 2015, pp. 39-42. (HBS)

Supporting Articles

- "Adobe Communication," Matt Gemmell, Blog Post.
  (http://mattgemmell.com/2011/11/09/adobe-communication/). In this post, Matt Gemmell takes a long and boring Adobe blog post written in "marketing speak" and makes it shorter, and easier to understand by writing it in "human speak." It's a good example of the type of honest, straightforward writing that I'm looking for.

September 5 — IT Doesn't Matter?: In this class, we will debate whether IT will make it easier or harder for firms to gain competitive advantage over their rivals. There are two broad schools of thought about how IT will impact competitive strategy. The first says that investment in IT can lead to proprietary advantages to the firm that are hard for competitors to copy. The second says the exact opposite: that the very nature of IT means that investments are readily and easily available to competitors, and as such IT is a commodity input, providing strategic advantage to no one. Which side is right?

Required Articles

- "IT Doesn't Matter," Nicholas G. Carr, OnPoint Edition (with Letters to the Editor), HBS Product Number 3566. (HBS)
- "Beyond the Productivity Paradox," Erik Brynjolfsson and Lorin Hitt, Communications of the ACM, August 1998, pp. 49-55. (Canvas)
- "Investing in the IT That Makes a Competitive Difference," Andrew McAfee and Erik Brynjolfsson, Harvard Business Review, July-August 2008. (HBS)

Supporting Articles

- "Dog Eat Dog," Andrew McAfee and Erik Brynjolfsson, Wall Street Journal, April 28, 2007. (http://online.wsj.com/article/SB117735476945179344-search.html and Canvas)
- "Scale without Mass: Business Process Replication and Industry Dynamics," Erik Brynjolfsson, Andrew McAfee, Michael Sorell, Feng Zhu, Working Paper, MIT Sloan School of Management (http://ssrn.com/abstract=980568)
- "VII Pillars of Productivity," Erik Brynjolfsson, Optimize, May 2005. (http://tinyurl.com/5h89bs)
- "IT Does So Matter!" Computerworld, Kathleen Melymuka, July 7, 2003. (http://www.computerworld.com/article/2571616/it-management/it-does-so-matter-.html)

Assignment: Fourteen years ago, Nick Carr wrote an influential article in the Harvard Business Review entitled "IT Doesn't Matter." In this assignment, your team has been asked by the CEO of your company to evaluate whether your company should adopt Nick Carr's advice in the present timeframe. Feel free to be creative about what company you choose to "work for" as part of this exercise.

Ideally your response should use specific examples (including ones drawn from outside the assigned readings) to support your position. As you prepare your write-up, a useful thought experiment might be to imagine whether your firm would be better or worse off by following Nick Carr's advice.

My goal in this exercise is to get us thinking about whether (and if so why) companies can gain competitive advantage from investments in IT, something that, arguably, looks like a commodity input.

I would like for Team #1 to prepare a presentation taking the side that "IT investment doesn't matter" as a driver of sustainable competitive advantage and for Team #2 to prepare a presentation taking the side "IT investment does matter." Each presentation should last a maximum of 15 minutes and will be followed by 10 minutes of question and answer.

September 7 — What is Disruptive Innovation?: In this class we will present two theories of how new technologies, particularly information technologies, can threaten established companies' dominance: demand-side and supply-side disruption. We will present theories, discuss their application in markets, and begin to discuss how firms can respond to these changes.

Required Articles
- "Disruptive Technologies: Catching the Wave," Joseph L. Bower and Clayton Christensen. *Harvard Business Review*, January-February 1995. (HBS)
- "What is Disruptive Innovation?" Clayton M. Christensen, Michael Raynor, Rory McDonald. *Harvard Business Review*, December 2015. (HBS)
- "The Other Disruption," Joshua Gans. *Harvard Business Review*, March 2016. (HBS)

Supporting Articles
- "Quickster Is Dead: Netflix Kills DVD-Only Service Weeks After Unveiling It," Bianca Bosker, Huffington Post, November 10, 2011. (http://www.huffingtonpost.com/2011/10/10/qwikster-dead-netflix-kills_n_1003098.html)
- "The Disruption Machine," Jill Lepore. *The New Yorker*. June 23, 2014. (http://www.newyorker.com/magazine/2014/06/23/the-disruption-machine)
- "Taking A Wait-And-See Approach With Disruptive Innovations," Matt Marx, August 8, 2014. (http://techcrunch.com/2014/08/08/taking-a-wait-and-see-approach-with-disruptive-innovations/)
- "The Anatomy of Foresight Traps," Shane Greenstein, IEEE Computer Society, May-June 2005. (Canvas & http://www.kellogg.northwestern.edu/faculty/greenstein/images/htm/Columns/anatomy.pdf)
- "Creative Destruction and Deconstruction," Shane Greenstein, IEEE Computer Society. (Canvas & http://tinyurl.com/n75sos).

September 12 — Responding to Disruptive Change and The Crisis at Encyclopædia Britannica: In this class we will continue our discussion of theories for how companies can respond to disruptive change, and why it is so hard for companies to execute on these theories. We will illustrate our discussion with the experience of Encyclopædia Britannica.

Required Articles
- "The Crisis at Encyclopædia Britannica," Shane Greenstein and Michelle Devereux. Kellogg Case Number 251. (HBS)

- "Surviving Disruption," Maxwell Wessel and Clayton M. Christensen. *Harvard Business Review*. December 2012. (HBS)
- "Keep Calm and Manage Disruption," Joshua Gans. *Sloan Management Review*. Spring 2016. (HBS)

September 14 — Digital Transformation in Entertainment – Warner Brothers and AT&T: In this class we will discuss how technology is changing market power in the entertainment industry, focusing on the recent merger between AT&T and Time Warner.

Required Articles

- Mergers and Acquisitions: AT&T, Time Warner, and What Makes Vertical Mergers Succeed, Bharat Anand, Harvard Business Review Online, October 28, 2016. (HBS)
- "Making Sense of AT&T's Bid for Time Warner," Andrew Ross Sorkin, New York Times, October 23, 2016. (https://www.nytimes.com/2016/10/24/business/making-sense-of-atts-bid-for-time-warner.html)
- "The Movies Tech Giants Just Made That Should Terrify Hollywood," Andrew Wallenstein, Variety, June 20, 2017. (http://variety.com/2017/digital/opinion/moves-tech-giants-made-terrify-hollywood-apple-facebook-1202470920/)

Supporting Articles

- Warner Bros. Entertainment. Gary Pisano and Alison Berkley Wagonfeld. Harvard Business School Case 9-610-033, August 16, 2011. (HBS)

Assignment: In October 2016, AT&T announced plans to merge with Time Warner. In this case write-up I would like for you to evaluate whether the AT&T-Time Warner merger makes strategic sense. As Bharat Anand argues in his article, for this merger to make sense it should be the case that there are synergies between AT&T's assets and Time Warner's assets that will allow the combined company to create value in the entertainment marketplace that neither company could create separately. I would like for you to evaluate whether such synergies exist, and if so what they are and how they will help AT&T-Time Warner compete in the evolving entertainment marketplace.

I would like for Team #3 to prepare a 15 minute presentation of their findings which will be followed by 10 minutes of question and answer from the class.

September 19 — Platforms, Pipelines and Content Bubbles: In this class we will finish one remaining topic I wanted to cover from the "entertainment section" of the class — the massive increase in content creation caused by industry disruption. We will then talk about Geoff Parker and Marshall Van Alstyne's framework of understanding platform competition and how this competition is different than our traditional understanding of competition in "pipeline" markets.

Required Articles

- "Platforms, Pipelines, and the New Rules of Strategy," Marshall W. Van Alstyne, Geoffrey G. Parker, Sangeet Paul Choudary. *Harvard Business Review*, April 2016. (HBS)

- "FX's John Landgraf Sounds Alarm on 'Titantic Struggle' in Entertainment Economy," Variety, August 9, 2017. (http://variety.com/2017/tv/news/fx-john-landgraf-tca-1202520845/)

Supporting Articles

- "FX Chief John Landgraf on Content Bubble: This is Simply Too Much Television," The Hollywood Reporter, August 7, 2015. (http://www.hollywoodreporter.com/live-feed/fx-chief-john-landgraf-content-813914)
- "FX Chief Says Industry Hasn't Reached 'Peak TV' Yes, Blasts Netflix's 'Wonky' Economics, Adweek, January 16, 2016. (http://www.adweek.com/news/television/fx-chief-says-industry-hasn-t-reached-peak-tv-yet-blasts-netflix-s-wonky-economics-169063)
- "There are more TV shows now than ever before, but this executive says that'll end soon." Business Insider, August 9, 2016. (http://www.businessinsider.com/fx-president-on-peak-tv-2016-8/#last…re-304-scripted-shows-on-currently-we-have-322-shows-a-6-increase-1)

Assignment: The television industry has seen an explosion in new content creation in recent years with the number of scripted original television series increasing from 182 in 2002 to 454 in 2016 to what is expected to be over 500 shows by the end of 2017.[2] Some in the industry have argued that this level of production is unsustainable and will inevitably collapse, seriously harming the industry. John Landgraf, CEO of FX television has been most vocal in advancing this view, arguing at the 2015 Television Critics Association meetings that "there is simply too much television…the business is in the late stages of a bubble…we are playing a game of musical chairs, and they're starting to take away the chairs."[3] Last month at the 2017 Television Critics Association meetings he again raised concerns about the financial sustainability of the increased production of content, noting that Netflix is carrying $5 billion in debt.[4]

In this assignment I would like for you to advise Mr. Landgraf and the leadership team at FOX about whether or not the industry is in a content bubble and what is likely to happen to content production over the next 2-4 years.

I would like for Team #4 to prepare a presentation that should last a maximum of 15 minutes and will be followed by 10 minutes of question and answer from the class.

The other teams should prepare a 2-page write-up responding to the case question. You are free to choose your side, but if you argue that we are not in a content bubble I would like for you to address the sustainability of Netflix's significant debt position, and if you argue that we are in a content bubble I would like for you to address why we haven't seen a collapse after a nearly 15 year increase in production.

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[2] http://variety.com/2017/tv/news/peak-tv-scripted-series-count-2017-1202521118/
[3] http://variety.com/2015/tv/news/tca-fx-networks-john-landgraf-wall-street-1201559191/
[4] http://deadline.com/2017/08/fx-john-landgraf-tv-business-peak-tv-update-battle-for-talent-apple-tca-1202145714/
and http://www.indiewire.com/2016/08/john-landgraf-fx-peak-tv-1201714755/

September 21 — Digital Transformation in the News Media – Guest Lecture by Jamie Flannick and Paul Roehrig: In this class section Heinz alumnus Jamie Flannick and his colleague Paul Roehrig and will talk to us about their experience at Cognizant working with news media clients whose businesses are being disrupted by information technology.

Required Articles
- Cho, Daegon, Michael D. Smith, Alejandro Zentner. 2016. Internet adoption and the survival of print newspapers: A country-level examination. *Information Economics and Policy*, 37, 13-19. (Canvas) (You are welcome to read as much of this article as you'd like, but I'm only asking you to read the abstract, introduction and conclusion to get the "main idea" of what we are saying.)
- "Newsonomics: Your Gannettenfreude will only take you so far," Ken Doctor, NiemanLab Blog, November 4, 2016. (http://www.niemanlab.org/2016/11/newsonomics-your-gannettenfreude-will-only-take-you-so-far/)
- "Reuters Institute Digital News Report 2017," Nic Newman with Richard Fletcher, Antonis Kalogeropoulos, David A. L. Levy and Rasmus Kleis Nielsen. (https://reutersinstitute.politics.ox.ac.uk/sites/default/files/Digital%20News%20Report%202017%20web_0.pdf) (This is a long report. I am only asking you to read Section 1: Executive Summary and Key Findings (pp. 9-26) so you can get a flavor for current changes/trends in the industry.)

Supporting Articles
- "Breaking News," Clayton M. Christensen, David Skok, James Allworth, *Nieman Reports*, Fall 2012. (http://niemanreports.org/wp-content/uploads/pod-assets/ebook/niemanreports/fall2012/NiemanReports-Fall2012CoverStory.pdf)

September 26 — Digital Transformation in Higher Education: In 2013, Clay Christiansen was asked about industries that were about to be disrupted and he observed "higher education is just on the edge of the crevasse. Generally, universities are doing very well financially, so they don't feel from the data that their world is going to collapse. But I think even five years from now these enterprises are going to be in real trouble."[5]

On the other hand, blogger Aaron Bady observes that for all its supposed potential, there is no evidence that MOOCs and other online courses can compete with education provided at top institutions: "No one will ever choose Udacity over Harvard or U.Va., and while elite institutions like MIT, Stanford, Princeton, and my own University of California are leaping into the online education world head first, anyone who thinks these online brands will ever compete with 'the real thing' [is a sucker]… MOOCs are only better than nothing and speculation that this will someday change is worth pursuing, but for now, remains just that, speculation."

Assignment: In this assignment I would like your group to analyze the future of higher education in the presence of information technology and digital disruption. Specifically, your

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[5] "Clay Christensen: First the media gets disrupted, then comes the education industry," http://gigaom.com/2013/02/13/clay-christensen-first-the-media-gets-disrupted-then-comes-the-education-industry/

group has been asked by CMU's new president to analyze whether technology will disrupt the business models of top institutions like Carnegie Mellon, and if so how CMU should respond.[6] Will CMU's business model remain intact in spite of possible disruption at smaller, less well known schools, or will technology cause significant changes in even CMU's market as students realize that a $400/course from a great professor online is just as good (or even better) than $40,000/year tuition for in-person education and as employers realize that they don't need "college degree" certification to evaluate the quality of applicants.

I would like for Team #5 to prepare a presentation arguing that technological change *will not* significantly impact CMU's business and I would like for Team #6 to prepare a presentation arguing that technological change *will* significantly impact even top schools like CMU. Each presentation should last a maximum of 15 minutes and will be followed by 10 minutes of question and answer from the class. The other teams are free to choose a side in their 2-page write-ups responding to the case question.

Below, I have included some potentially relevant articles that I found. This may be a helpful starting point for your analysis, but I hope you will go beyond this list as you explore this week's question.

General Articles:
- "Business School, Disrupted," New York Times, May 31, 2014. (http://www.nytimes.com/2014/06/01/business/business-school-disrupted.html)
- "Carnegie Mellon's online efforts include spinoffs and subsidiaries but not MOOCs," Ry Rivard, February 28, 2013. (http://www.insidehighered.com/news/2013/02/28/carnegie-mellons-online-efforts-include-spinoffs-and-subsidiaries-not-moocs)
- "Does Higher Education Fit the Narrative of 'Streaming, Sharing, Stealing'?" Joshua Kim, Inside Higher Education Blog, February 20, 2017. (https://www.insidehighered.com/blogs/technology-and-learning/does-higher-ed-fit-narrative-streaming-sharing-stealing)
- "Will this be on the test?" Seth Godin, March 1, 2016. (https://medium.com/swlh/will-this-be-on-the-test-237ae9cc53b4#.n2ka5h6ue)
- "Harvard Business School and the Online Threat," Joshua Gans, June 4, 2014. (https://digitopoly.org/2014/06/04/harvard-business-school-and-the-online-threat/)

Supporting Articles: Higher Education (Probably) Will Be Disrupted
- "Napster, Udacity, and the Academy," Clay Shirky, November 18, 2012. (http://www.shirky.com/weblog/2012/11/napster-udacity-and-the-academy/)
- "The Crisis in Higher Education," Nicholas Carr, MIT Technology Review, September 27, 2012. (http://www.technologyreview.com/featuredstory/429376/the-crisis-in-higher-education/)
- "Uber Would Like To Buy Your Robotics Department, Clive Thompson, New York Times, September 13, 2015. (https://www.nytimes.com/2015/09/13/magazine/uber-would-like-to-buy-your-robotics-department.html)

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[6] My rationale for focusing on "top institutions" like CMU is primarily that I think it is almost obvious that second- and third-tier institutions are in deep trouble (see http://www.forbes.com/sites/schifrin/2013/07/24/is-your-college-going-broke/ or http://www.economist.com/node/21532269)

- "Udacity Says It Can Teach Tech Skills to Millions, and Fast," Farhad Manjoo, New York Times, September 16, 2015. (https://www.nytimes.com/2015/09/17/technology/udacity-says-it-can-...ns.html)
- "Use of MOOCs And Online Education Is Exploding: Here's Why," Forbes, January 5, 2016. (https://www.forbes.com/sites/joshbersin/2016/01/05/use-of-moocs-and-online-education-is-exploding-heres-why/#3fca96837649)

Supporting Articles: Higher Education (Probably) Will Not Be Disrupted

- "Questioning Clay Skirky," Aaron Bady, December 6, 2012. (http://www.insidehighered.com/views/2012/12/06/essay-critiques-ideas-clay-shirky-and-others-advocating-higher-ed-disruption)
- "Technology Has Its Place: Behind a Caring Teacher," Darryl Tippens, The Chronicle of Higher Education, August 6, 2012. (http://chronicle.com/article/Technology-Has-Its-Place-/133329/)
- "MOOC enrollment drops at HarvardX and MITx after free certifications disappear," Techcrunch, January 13, 2017. (https://techcrunch.com/2017/01/13/mooc-enrollment-drops-at-harvardx-and-mitx-after-free-certifications-disappear/)
- "The Future of Online Education Is on Campus," Inc.com, July 30, 2013. (https://www.inc.com/issie-lapowsky/future-online-education-on-campus.html/1)
- "University of Phoenix has lost half its students," CNN.com, March 25, 2015. (http://money.cnn.com/2015/03/25/investing/university-of-phoenix-apollo-earnings-tank/)

September 28 — Digital Transformation in Retail — H.E. Butt Grocery Corporation (A) and (B) (HBS 9-196-061 and 9-198-016) and Amazon Buys Whole Foods: In this class, I'd like to review digital transformation in the retail industry with a focus on groceries.

We'll start with a historical discussion of digitization in grocery supply chains based on the HEB Grocery case. HEB Grocery Corporation is a medium sized, regional grocery chain facing a set of changes to their business model and industry resulting from innovations in the use of IT systems. This case is meant to illustrate how digital transformation can impact the operations in an entire industry.

We will then apply our understanding of the U.S. grocery industry to analyze Amazon's recent purchase of Whole Foods — a purchase which seems curious given Amazon's focus on online/virtual transactions and the number of retail chains that are closing because of the increased efficiency of online channels. If online channels are more efficient than offline channels, why is Amazon spending $13.7 billion to purchase a nationwide grocery chain?

Required Articles
- H.E. Butt Grocery Corporation (A), HBS Case 9-196-061. (HBS)
- H.E. Butt Grocery Corporation (B), HBS Case 9-198-016. (HBS)
- "Amazon to Buy Whole Foods for $13.7 Billion," Wall Street Journal, June 16, 2017. (https://www.wsj.com/articles/amazon-to-buy-whole-foods-for-13-7-billion-1497618446 and Canvas)

- "Wal-Mart and Google Partner to Challenge Amazon," Wall Street Journal, August 23, 2017. (https://www.wsj.com/articles/wal-mart-and-google-partner-to-challenge-amazon-1503460861 and Canvas)

October 3 — Disruption in Transportation — Data, Algorithms, and Driverless Cars: In this class, I would like to talk about driverless cars and their impact on business strategy. We will do this in the context of Google's investments in driverless innovations.

Required Articles
- Google Car, HBS Case 9-614-022. (HBS)

Supporting Articles
- "Tesla's Not as Disruptive as You Might Think," Harvard Business Review, May 2015. (https://hbr.org/2015/05/teslas-not-as-disruptive-as-you-might-think)
- "Is Tesla Really a Disruptor? (And Why the Answer Matters)," Harvard Business Review, August 2017. (https://hbr.org/2017/08/is-tesla-really-a-disruptor-and-why-the-answer-matters)
- "Apple Scales Back Its Ambitions for a Self-Driving Car," New York Times, August 22, 2017. (https://www.nytimes.com/2017/08/22/technology/apple-self-driving-car.html)

Assignment: Google has entered the automotive industry by developing technology for autonomous vehicles. The company faces key decisions on a go to market strategy for this technology and the overall fit between its mission to "organize the world's information and make it universally accessible and useful."

In your write-up, I would like for you to advise Sundar Pichai on what strategy his company should pursue in investing in autonomous vehicle technologies. To answer this question you may wish to consider what motivated Google to invest in Autonomous Vehicle Technology, how they may be able to make money from this technology, and what other companies and industries are pursuing similar strategies and Google's strategic positioning relative to these potential competitors.

I would like for Team #7 to prepare a 15 minute presentation of their findings which will be followed by 10 minutes of question and answer from the class.

Module 3: Digital Transformation of Society and Policy

October 5 — Guest Lecture: Rick Lane – The Uber Rich vs. the Uber Driver: In this class, Rick Lane, discuss how technology is changing the distribution of wealth and what the means for society. Mr. Lane has 15 years of experience working in government and public policy affairs and retired earlier this year as the Senior Vice President of Government Affairs at 21st Century Fox.

Required Articles

- "Hard Questions on Our Transition to Driverless Cars," Ashish Khanna and Simon Barrett, Harvard Business Review, April 11, 2017. (https://hbr.org/2017/04/hard-questions-on-our-transition-to-driverless-cars)
- "Driverless cars and trucks don't mean mass unemployment—they mean new kinds of jobs." Cathy Engelbert, LinkedIn, August 22, 2017. (https://www.linkedin.com/pulse/driverless-cars-trucks-dont-mean-mass-new-kinds-jobs-cathy-engelbert)
- "False Alarmism: Technological Disruption and the U.S. Labor Market, 1850-2015." Robert D. Atkinson and John Wu, Information Technology & Innovation Foundation, May 2017. (http://www2.itif.org/2017-false-alarmism-technological-disruption.pdf)
- "Robots, Automation, and Jobs: A Primer for Policymakers." Information Technology & Innovation Foundation, May 2017. (http://www2.itif.org/2017-automation-primer.pdf)

October 10 —Digital Transformation in Law Enforcement — Going Dark: As the world continus its shift into the digital, more aspects of our lives are lived through, and dependent on, data and digital devices. This shift has required technology manufacturers to emphasize encryption and robust security in their evolving designs. While this pursuit of security is necessary to keep user's critical personal information safe, criminals and terrorist organizations are using these same security technologies making it difficult and even impossible for authorities to access that data. Law enforcement agencies say that they must have the technical ability to lawfully access digital data via court order, while many technologists and privacy advocates hold that authorities should never force companies to weaken or circumvent security under any circumstance.

Required Articles

- Minnesota detectives crack the case with digital forensics," Shannon Prather, StarTribune, October 6th 2014. (http://www.startribune.com/when-teens-went-missing-digital-forensics-cracked-case/278132541)
- "Smartphone Encryption and the Impact on Crime Victims," New York District Attorney's Office, April 18th 2016. (http://manhattanda.org/sites/default/files/4.18.16%20Victim%20Organizations%20Presentation.pdf)
- Order Compelling Apple, Inc. to Assist Agents in Search, United States District Court for the Central District of California, ED 15-0451M, February 16th 2016. (https://assets.documentcloud.org/documents/2714005/SB-Shooter-Order-Compelling-Apple-Asst-iPhone.pdf)
- "A Message to Our Customers," Apple Inc., February 16th 2016. (http://www.apple.com/customer-letter/)
- Brief of Amici Curiae Amazon.com, Box, Cisco Systems, Dropbox, Evernote, Facebook, Google, Microsoft, Mozilla, Nest, Pintrest, Slack, Snapchat, Whatsapp and Yahoo in support of Apple, Inc., ED No. CM 16-10 (SP), March 3rd, 2016 (https://www.documentcloud.org/documents/2746916-Amazon-Cisco-Dropbox-Evernote-Facebook-Google.html)

Supporting Articles
- "Apple's FBI Battle is Complicated. Here's What's Really Going On," Kim Zetter, Wired, February 18th 2016. (https://www.wired.com/2016/02/apples-fbi-battle-is-complicated-heres-whats-really-going-on/)
- iOS Security Guide – (www.apple.com/business/docs/iOS_Security_Guide.pdf)

Assignment:

In today's digital world data can be effectively concealed if the right encryption techniques and security procedures are used. Until now, U.S. law enforcement has maintained the ability to lawfully access evidence via court order, even in a locked safe or other secured area. With the advent of robust data security, evidence of crimes can be stored in a "digital safe" that is inaccessible to authorities.

In the classroom presentation, I would like for Team #8 to prepare a presentation that argues that, given a lawful court order, manufacturers should be compelled to assist authorities in accessing secured data on the Internet, on computers, on mobile devices, or wherever that data may reside. Conversely, I would like Team #9 to prepare a presentation arguing that manufacturers should be under no obligation to assist authorities to obtain data from devices, even with a court order.

The remaining teams should produce a 2 page case write-up choosing a side in this debate. All teams should consider the following points in your answer:

- Access to a specific device/container vs. a "Master Key"
- Access to a specific device/container vs. a "backdoor" (vulnerability?)
- Precedent being set by robust encryption (for criminals)
- Precedent set if technology companies were forced to assist.
- Impacts on Security/Privacy and on Public Safety (perceived or realized)

October 12 — Digital Transformation of Government and Wrap-up: I'd like to start with a discussion of how digital transformation might impact governments and how they should respond to the opportunities and threats posed by technological developments. I'd then like to wrap up our class with a discussion of the major themes we've covered this mini.

Required Articles
- "Track how technology is transforming work," Tom Mitchell and Erik Brynjolfsson, Nature, April 20, 2017. (Canvas)
- "China's All-Seeing Surveillance State Is Reading Its Citizens' Faces," Liza Lin, Wall Street Journal, June 26, 2017. (https://www.wsj.com/articles/the-all-seeing-surveillance-state-feared-in-the-west-is-a-reality-in-china-1498493020 and Canvas)