95-722 - Digital Transformation

Carnegie Mellon University

Masters of Information Systems Management Program

Fall 2016, Mini 2

Instructor:
Michael D. Smith
Hamburg Hall 2204
412-268-5978
mds@cmu.edu

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:

Kristen Olinski
Hamburg Hall just outside of 2204
412-268-7148
kolinski@andrew.cmu.edu

Teaching Assistants:

Section A: Uttara Ananthakrishnan (umadurai@andrew.cmu), Hamburg Hall 3003
Section B: Yingjie Zhang (yingjie2@andrew.cmu.edu), Hamburg Hall 3041
Section C: Xiaoying Tu (xiaoying@cmu.edu), Hamburg Hall 3041

Course Information:

<table>
<thead>
<tr>
<th>Section</th>
<th>Days</th>
<th>Time</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>Section A</td>
<td>TuTh</td>
<td>9:00-10:20</td>
<td>HBH 1204</td>
</tr>
<tr>
<td>Section B</td>
<td>TuTh</td>
<td>10:30-11:50</td>
<td>HBH 1204</td>
</tr>
<tr>
<td>Section C</td>
<td>TuTh</td>
<td>1:30-2:50</td>
<td>HBH 1204</td>
</tr>
</tbody>
</table>

Classroom: October 25 – December 8
Take-Home Final Exam: Due midnight December 15
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.

Cheating includes but is not necessarily limited to:

- 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](http://www.cmu.edu/hr/eos/forms/carnegie_mellon_hotline_poster.pdf)).

**Course Web Site:**

Web: http://blackboard.andrew.cmu.edu

We will use the blackboard site 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 Blackboard 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: 40%
2. Case Analysis: 40%
3. Final Exam: 20%

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 Blackboard 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 December 15.

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.

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 Blackboard.

Unless otherwise announced, all assignments are due to Blackboard 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 (BB) are available on Blackboard.

October 25 — 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.

Module 1: Transformation of Competitive Advantage

October 27 — 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.

Required Articles

- “The Digitization of Just About Everything,” Andrew McAfee and Erik Brynjolfsson, Rotman Management Magazine, Fall 2015, pp. 39-42. (HBS)
- “Why I Just Asked My Students To Put Their Laptops Away,” Clay Shirky, Blog Post. (https://medium.com/@cshirky/7f5f7c50f368)

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 8 — IT Doesn’t Matter Debate: 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)

Supporting Articles
• “VII Pillars of Productivity,” Erik Brynjolfsson, Optimize, May 2005. (http://tinyurl.com/5h89bs)

Assignment: A little over 12 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.

I would like for Team #1 to prepare a presentation taking the side that “IT doesn’t matter,” and for Team #2 to prepare a presentation taking the side “that IT does matter.” Each presentation should last a maximum of 15 minutes, and will be followed by 10 minutes of question and answer from the class for each team.

The other teams should prepare a 2-page write-up responding to the case question.

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.

November 3 — Class Cancelled: I apologize, but I need to cancel this class because of a travel commitment.
November 8 — Guest Lecture: Scott Sander, President & CEO, SightSound Technologies:
In this class, Scott Sander, President and CEO of SightSound Technologies, will give a guest lecture on how technology is changing the entertainment industry from his perspective as an inventor/entrepreneur and TV/movie producer.

Required Article


November 10 — Class Cancelled: Again, I apologize that I need to cancel this class because of a travel commitment.

November 15 — Digital Transformation and The Crisis at Encyclopædia Britannica (Kellogg Case 251):
In this class we will discuss how new technologies, particularly information technologies, can disrupt competition in industries. 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)
- “Netflix, Inc.: Streaming Away From DVDs,” David Wesley, Luis Alfonso Dau, Northeastern University College of Business Administration, Case W12850. (HBS)

Supporting Articles


Assignment: In this case write-up, I would like for you to apply the principles of Clay Christensen’s disruptive change to the setting of Netflix and the rise of online streaming technologies. Specifically, I would like for you first to evaluate how online streaming represents a disruptive technology relative to the Netflix’s traditional business of renting DVDs by mail,
and then evaluate how well Netflix’s managers responded to the rise of the online streaming business, particularly as it pertains to Christensen’s advice for how to respond to disruptive technologies.

**November 17 — Guest Lecture: Matthew Polka and Robert Sherma, President/CEO and Executive Vice President, American Cable Association:** In this class, Matt Polka and Rob Sherma of the American Cable Association will talk about how technology has changed, and is changing, the business of television delivery and will discuss their perspective on the future of the cable industry in the context of digital transformation.

**November 22 — Digital Transformation in The Motion Picture Industry:** We’ve discussed how technology is changing the creative industries. In this class I would like for you to consider how these changes are likely to alter the structure of these industries in the next 5 years.

**Required Articles**

**Assignment:** In this assignment I would like your group to evaluate how digital technologies will change the structure of the motion picture industry in the next 5 years. By structure, I mean the number of companies and their power and profitability in the industry. Historically, we have seen 3-5 major studios dominate the industry and we have seen that content production typically has the “upper hand” over content distribution.

Your question is: What is the industry likely to look like 5 years from now in terms of who is in “power.”

To prepare for making your argument, it would be helpful to read the Warner Bros. case and take some time to understand what factors in the motion picture industry have caused a small number of large studios to dominate the industry and maintain power over content distributors, and artists and other content creators. What are the entry barriers for smaller players? Why do smaller players have trouble competing against the large incumbents?

I would like for Team #3 to prepare a presentation, which should last a maximum of 15 minutes, and will be followed by 10 minutes of question and answer from the class for each team. The remaining teams should prepare a 2-page write-up.

**November 24 — Thanksgiving:** No classes scheduled.
Module 2: Transformation of Organizational Structure

November 29 — Big Data, Organizational Structure and Competitive Advantage: In this class we will revisit the arguments of “IT Doesn’t Matter” from last time and then talk about an important, and under discussed, aspect of competitive advantage: whether firms can use control over “Big Data” to gain a competitive advantage over their rivals.

Required Articles

• “Harrah’s Entertainment Inc.,” Harvard Business School Case 9-502-011. (HBS)

Supporting Articles


December 1 — Debate: Will IT Lead to More Centralization or Decentralization in Organizational Structure: IT can be used to change the structure of organizations, and these changes can fall into one of two broad categories: more centralized structures or more decentralized structures.

For the purpose of this class, let’s define a decentralized structure as one where IT is used to allow more employees make independent decisions about how to allocate their time, and where more employees have more of a “say” into how decisions get made than they did prior to IT. In contrast, a centralized structure is one where IT is used to take decision rights away from employees and impose structures onto those employees.

In the context of “decentralized” structures, James Surowiecki’s book “The Wisdom of Crowds” argues for a world where information technology can be used to efficiently take into account the input from a variety of employees, where instead of decisions being made by senior managers, all employees can put their knowledge and data to make a more collective decision. Similarly, Tom Malone and Robert Laubacher argue that Information Technology will be used to move decision-making from centralized structures toward markets and loose collections of smaller organizations: “The dominant business organization of the future may not be a permanent corporation but rather an elastic network.”

In the context of “centralized” structures, Shoshana Zuboff’s discusses the use of IT to centralize control over a larger number of employees than could be possible in a pre-IT organization: “Information systems can alter many of the classic contingencies of the superior-subordinate relationship, providing certain information about subordinates’ behavior…and so induce compliance without the messy conflict-prone exertion of reciprocal relations.” And her vision of an “information panopticon” where all employees’ actions are closely monitored and carefully
dictated from above may ring true to anyone who has worked in a call center, fast food restaurant, or delivery service.

In this class, I’d like to debate how the use of IT will change the structure of organizations, and in particular whether IT will in general lead to more centralized or more decentralized organizations.

**Required Articles**


**Supporting Articles**


**Assignment:** I would like for your group to evaluate in what contexts is IT likely to lead to more decentralized decision-making in organizations (as in Malone’s view) and in what contexts is IT likely to lead to more centralized decision-making in organizations (as in what we saw in the Harrah’s case and in Amazon’s use of data to evaluate employees). In both cases, please explain why organizing in this way will be more efficient to the organizations and how IT will facilitate this change. Please also use as many specific examples as possible in your write-up.

In the classroom presentation, I would like for Team #4 to prepare a presentation discussing areas in which IT is likely to lead to more centralization, and for Team #5 to prepare a presentation discussing contexts where IT is likely to lead to more decentralization. Each presentation should last a maximum of 15 minutes, and will be followed by 10 minutes of question and answer from the class for each team.

The other teams should prepare a 2-page write-up responding to the case question.
Module 3: Transformation of Society and Policy

December 6 — Guest Lecture: Amy Isbell, Senior Vice President of Public Policy and Government Relations, Universal Music Group; Mitch Glazier, Senior Executive Vice President, Recording Industry Association of America: In the last week of class, I’d like to switch to a discussion of the impact of technology on policy questions. We’ll start with a guest lecture from Amy Isbell, Senior Vice President of Public Policy and Government Relations at Universal Music Group and Mitch Glazier, Senior Executive Vice President of the Recording Industry Association of America regarding how technological change is impacting public policy in the entertainment industry.

December 8 — Going Dark: Digital Transformation, Security/Privacy, and Public Safety Debate: As the world has continued 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

- 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


Assignment:

In today’s digital world data can be effectively concealed if the right encryption techniques and security procedures are used. Until now, 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 #6 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 #7 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)