95723 – Managing Disruptive Technologies

Instructor
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Course blog: http://www.vibhanshu.com/courses/telecom/ (Links to an external site.)
Classes: Section A - HbH 1000 MW 1:30-2:50PM, Section B - HbH 1502 R, 6:00-8:50 PM
Office hours: Tuesday – 1:30-3:00PM

Course Overview
We live in a rapidly changing world dominated by technology-enabled disruptions. As a consequence, there is a strong need for individuals who understand the nature of these innovations and how they affect markets, in
order to tap into all this potential. In line with this need, this course is about understanding disruption from a technical and a managerial point of view. The course will focus on understanding the differentiation between incremental and revolutionary innovations. You will study the technologies behind these innovations and their implications for business models and the geometry of markets. This course will combine a number of lectures introducing fundamental concepts of economics and management applied to technology-enabled markets, such as the theory of disruptive innovation, network externalities, two-sided markets, multi-sided platforms, single-homing v/s multi-homing, first mover advantage, platform-envelopment, switching cost and pricing models for disruptive innovations. The economics concepts will be combined with discussion around several disruptive technologies like the Internet, online social networks, content distribution networks, virtualization, mobile-payments, cloud computing, mobile platforms, data analytics and the Internet of Things. This will be supplemented by case studies looking at specific real world examples such as Facebook, e-Bay, Akamai, Hulu and Android. You will learn how to anticipate disruptive technologies both from technical and managerial perspectives, and will obtain understanding of frameworks and tools to characterize, leverage and manage these technologies in the work place. The course will also include a number of invited lectures by prominent speakers from the industry and academia.

**Learning Objectives**

The course has five primary learning objectives. After this course you should be able to:

1. Understand the theory of disruptive innovation, how disruptive innovation differs from sustaining innovation, and the distinction between low-end and new-market disruption.
2. Imbibe economic frameworks to evaluate how disruptive innovations bring about changes in the market by altering the geometry of the market and/or new business models.
3. Understand various disruptive innovations from a technical perspective and gain a basic working knowledge of these technologies.
4. Recognize disruptive technologies and predict their impact on different markets.
5. Identify market gaps and create technological innovations that can address these gaps by assimilating prior coursework on programming, economics and statistics.
Grading

The grading comprises five parts:

1. **Assignments:** There are 5 required assignments for the course. These assignments will be posted on Blackboard one week in advance. These assignments are supposed to be done individually without any discussion or help from anyone else. The assignments are worth 25 points of your overall grade.

2. **Team Presentations:** Each team of 4-5 students is supposed to present one of the cases in this class. Team assignment will be announced in the first week of the course and also posted on Blackboard. Cases will also be assigned to teams on a random basis. We will post questions and material that might help you in preparing the presentation. Each team will have 75 minutes for presentation. These presentations contribute 10 points towards your final grade.

3. **Final Project:** This course requires a final group project with 5-6 students per team. The objective of the project is to identify a market or social need using the frameworks discussed in class, and propose a technological solution to address this need. There are three main components –
   1. An initial write-up of the idea that clearly identifies the need, your solution to address that need and a plan of how your team will go about creating the technical prototype.
   2. A presentation including a demonstration of the technological solution at the end of the course.
   3. A final report in the form of a webpage.

   The final project is worth 35 points.

4. **Class Participation:** All students are expected to come prepared for the class and volunteer answers. If I do not see enough class participation, I would cold call for answers. However, credit will be given for the quality of answers, not the quantity. Class participation counts for 10 points of the final grade.

5. **Surprise Quiz:** There will be two surprise quizzes worth 10 points each. You are expected to come prepared to class everyday for these quizzes.

All assignments are due at the time indicated on Canvas.

Finally, grades are given on the curve, which means that grades are relative across students. In other words, if you score 10 out of 60 in the final essay you will get an A in the essay if everybody else scored, for example, 9 or below. Also, if you score 55 out of 60 in the essay, you will get a C in the essay if everybody else scored, for example, 59 or above. For a core course at the Heinz
College, such as this one, roughly a third of the class will have a grade A- or above.

Case Studies

Case studies are used to cover the most important concepts in technology disruption and management. Each team of randomly assigned 4-5 students is required to present one case in class and lead the discussion. This will be done with a number of questions in mind that are identified ahead of time for each case. Each team has 75 minutes to present the case and lead the discussion in class with help from the Instructor. In addition, all students in the class are required to read the cases beforehand and contribute to the discussion. The instructor will lead the discussion of the first case as an example of what is expected for the discussion of the subsequent cases.

Below is a preliminary schedule for the cases to be discussed along the semester. Additional relevant documents and references for each case will be posted on Blackboard as we go along. If you have any questions about the case studies, do not hesitate to get in touch with either the Instructor or the Teaching Assistants. Our contact information is provided on Blackboard. Finally, note that each case represents a fee that will show up in the account of each student. In most cases, these case studies are property of the Harvard Business School (HBS) and can only be used for teaching purposes if acquired directly from HBS. We will order the cases directly from HBS as a group to benefit from group discounts. However, each student is then required to pay for each case. Photocopying cases is an infringement of copyright law. Such an offense can be seriously prosecuted. The cost of each case varies between $5 and $10. We will order cases for every student registered in the course unless we hear otherwise from you.

Plagiarism and Proper Attribution

Plagiarism and cheating is strictly forbidden in any form. This includes both copying your classmate’s work and idea of other writers without crediting source. The following potential punishment will be enforced according to CMU policy.

“Plagiarism is considered a serious offense in any academic or professional field. In school, the instructor of the course in which the act occurs determines the penalties for a specific act of plagiarism. You could receive an “F” for the
paper or project in question, fail the course, or even be brought up for university disciplinary action, possibly resulting in expulsion.”

Plagiarism is a very serious offense and will not be tolerated. It can result in immediate loss of support and even expulsion from the University. If you are unsure of how to cite a source, or not sure if you need to cite a source ask the TAs or the course instructor. Please review it carefully. For more on plagiarism and University policy, see: http://www.cmu.edu/policies/documents/Academic%20Integrity.htm (Links to an external site.)

Here are some basic rules: If you use any text written by someone else in any of your work, you must place it in quotation marks and provide a citation for the source. Thus, for example, you may say: It has now been demonstrated that: "Large-scale use of wind power can alter transport in the atmospheric boundary layer." (Keith et al., 2004)

But you may not say: It has now been demonstrated that large--scale use of wind power can alter local and global climate by extracting kinetic energy and altering turbulent transport in the atmospheric boundary layer.

You can of course also use numbered footnotes or endnotes. If you use the (Author, date) form of citation, then these should be paired with full references, sufficient for a reader to find the source. If the reference is a web source, include the web address.

Under the "fair use" terms of U.S. copyright law, it is perfectly fine to quote, with proper attribution, short excerpts from copyrighted works. If you start using very large portions of copyrighted text, you may need to obtain permission from the holder of the copyright (typically the journal, not the author) if you are going to publish the piece or distribute it widely. Obtaining such permission is generally not required for government documents.

Facts or ideas, which are not general knowledge, also need to be referenced. E.g: Foreign student enrollments at LaRoche College in the Pittsburgh area dropped by 23.7% between 2002-3 and 2003-4 (Schackner, 2004). The same goes for figures taken from other sources, including off the Internet. All such figures must carry a citation.

Suggested Readings

No one book will cover all the material I plan to cover. I recommend the following books that can act as a useful guide but you must keep in mind that
posts on canvas and my lecture notes will be crucial for preparing for this course.


Additional reading material will be provided as and when required.

There are several online resources that will keep you up to date with the latest news on disruptive technologies. The New York Times (Links to an external site.) and the Wall Street Journal (Links to an external site.) are excellent sources of current and very readable reports on information technology. Tech Crunch (Links to an external site.) and Venture Beat (Links to an external site.) are excellent sources of information on how entrepreneurs are driving disruptive innovation.

Tentative Schedule

Mon Jan 12, 2015 - Lecture 1: Introduction to class, course mechanics

Wed Jan 14, 2015 - Lecture 2: Disruptive technologies - an economic perspective

Wed Jan 21, 2015 - Lecture 3: Network externalities

Mon Jan 26, 2015 - Lecture 4: Technology Adoption

Wed Jan 28, 2015 - Lecture 5: Facebook case

Mon Feb 02, 2015 - Lecture 6: Two-sided markets

Wed Feb 04, 2015 - Lecture 7: Pricing models for disruptive technologies

Mon Feb 09, 2015 - Lecture 8: Marketplaces - Online Auction markets case

Thu Feb 12, 2015 - Lecture 9: Guest Lecture on Platform-enabled business models – Sangeet Paul Choudary, Platform Thinking

Mon Feb 16, 2015 - Lecture 10: The Internet

Wed Feb 18, 2015 - Lecture 11: CDN Technologies
Mon Feb 22, 2015 - Lecture 12: Akamai case

Wed Feb 25, 2015 - Lecture 13: **Guest Lecture** on Application Delivery Networks: Manav Ratan Mital, InstartLogic

Mon Mar 02, 2015 - Lecture 14: Mobile Payments - NTT DoCoMo: Mobile Felica case

Wed Mar 04, 2015 - Lecture 15: Midterm Project Presentation

Mon Mar 16, 2015 - Lecture 16: Platform-envelopment - Linux v/s Windows case study

Wed Mar 18, 2015 - Lecture 17: Virtualization -VmWare case


Mon Mar 30, 2015 – Lecture 20: Disrupting the Music Industry - Rhapsody Realplayer case

Wed Apr 01, 2015 - Lecture 21: Cutting the Cable - Hulu case


Wed Apr 08, 2015 – Lecture 23: The Data Revolution

Mon Apr 13, 2015 – Lecture 24: Internet of Things Lecture

Wed Apr 15, 2015 – Lecture 25: **Guest Lecture** on Wearables and Internet of Things – Stuart Crawford, Jawbone

Mon Apr 20, 2015 – Lecture 26: Course wrap up with additional examples – Airbnb, Uber, Fon, Google Express, IBM Watson (Section B)

Wed Apr 22, 2015 – Lecture 27: Project

Mon Apr 27, 2015 – Lecture 28: Project presentations