This course serves as an introduction to online business models and online innovation. It provides an introduction to identifying business opportunities based on innovative use of information and technology. As importantly, it provides an introduction to formal analytical techniques for evaluating potential opportunities using historical patterns and computer models. The content of the course will be divided between identifying business opportunities for information-based strategies and constructing computer-based models for the evaluation of innovative businesses. The course is intended to provide a foundation for further study in information-based strategies, online innovation, strategic consulting, and private equity, and of course for further study in OIDD. This course fulfills 0.5 credit units in the new Wharton Flex Fundamentals / Technology Requirement.

Course Objectives

Students who complete the course will be prepared to find online business opportunities, evaluate new businesses as investment opportunities, and evaluate their own plans for online innovation.

Required Texts

The primary text for the course is a small number of chapters selected from New Patterns of Power and Profit: A Guide to the Information Age. The published text has not yet been released, so students will have access (without charge) to pre-publication material posted online. A single unit will also be required from Oh, Yeah, Now I Get It: Learning to solve really complicated problems In business, in society, and in life. This is a more mathematic treatment of the material introduced in New Patterns of Power, and it too will be available to students without charge. Students will also need to download the Goldsim User’s Guide, available without charge online at www.goldsim.com/Web/Downloads/UserManuals. A few additional readings will be provided, primarily to augment students’ understanding of the construction and use of computer simulation models. Finally, additional online readings, such as Op Eds by the instructor, may be assigned where they are relevant.
Required Software

Students will need access to a computer that will run Goldsim, a simulation program that will be made available to Wharton students without charge. Students will be able to download Goldsim onto their own Windows-compatible PC or to their Mac running a Windows emulator. Goldsim will also be available online on an OID server and in the computer labs. Details will be provided in the first class.

Course Pedagogy and Philosophy

Wherever possible, material will be introduced through readings rather than through lectures. Lectures will be used sparingly, to cover material that is complex enough to require interactive discussion. Class time will be used primarily to provide in-depth discussion of the implications of key concepts covered in the readings and to provide assistance in the design and development of computer models that have been assigned as homework.

Assignments and Grading

There will be two computer-based simulation assignments and several in-class discussions during the semester. Please note that all written assignments are shown in RED in the electronic version of the course syllabus. Dates when written assignments of any kind are due are noted in RED, both in the session-by-session course outline and at the top of each day’s page in the syllabus. Classes that require additional preparation for discussion but do not have written assignments due are highlighted in BLUE, both in the session-by-session course outline and at the top of each day’s page in the syllabus. Written assignments should all be done in groups of two or three students. These same groups may wish to work together to prepare for discussion sessions as well.

Written assignments must be submitted electronically to the course website at the start of the class sessions in which they are due; since assignments will usually be discussed in class on the date that they are due, it will not be possible to accept late assignments unless prior arrangements have been made.
Color Coding in the Syllabus

A **bold red session heading** indicates that something is due at the beginning of the day’s class. A **bold blue session heading** indicates that this is a discussion session, although there may not be a written assignment due.

Student Bios

Please send a word file containing a short biographical sketch, not a full resume, via email, to clemons@wharton.upenn.edu. Please title your attached file 201S18_I_NAME.doc, where I is your first initial, and NAME is your last name. Please provide the following information:

* your expected concentration at Wharton
* your experiences relevant to the topics of this course
* your reasons for taking this course and what you hope to get out of it
Course Outline and Readings

Unit 1 — Strategy and Agility in the Face of Discontinuous Change

Session 1 W 10-Jan  Introduction and Course Overview:
Information changes everything, role of patterns in problem solving, and the importance of new information-based patterns for analyzing new, information-based strategies. The importance of accurate, replicable analysis, for strategic planning, investment management, private equity, and strategic consulting.

Intent: This session is intended to provide an introduction to the course and to the computing resources that it will require.¹

Read: New Patterns of Power (Prolog)

Session — M 15-Jan  No Class — Martin Luther King Jr. Birthday

Session 2 W 17-Jan  Newly Vulnerable Markets
Our first new information-based pattern: Newly vulnerable markets, and the Capital One case discussion, plus extensions to other companies with significant differences in customer profitability and the possibility of screening mechanism to accurately identify and target most profitable customers.

Intent: This session is intended to provide an introduction to a complex problem in the vulnerability of established markets to certain forms of opportunistic pickoff of profitable customers, enabled specifically by information and information technology. It will be the basis of our first simulation assignment, in which students will model the impact of opportunistic pickoff of incumbents’ most profitable customers, and the difficulty of devising effective responses and effective counter strategies. It will introduce the Capital One case study, but augment it with a discussion of similar strategies at other companies, like Uber.

Read: New Patterns of Power (Chapter 1 Section 6, Chapter 2 Section 3)

Discussion: Newly Vulnerable Markets at Capital One

¹ Note that the material marked “intent” is to facilitate review of the syllabus during the approval / evaluation process. Much of this will either be dropped or merged into the detailed description of individual sessions, as appropriate.
Session 3  M 22-Jan **But How Would You Know? The Role of Modeling in Assessing the Future Value of Innovation**

*But how would you know? Statistical decision making under uncertainty. Introduction to simulation modeling. Simple valuation via Monte Carlo simulation in Goldsim.*

**Intent:** This session is intended to provide a review of mechanisms for evaluating new businesses, especially truly innovative information-based online businesses, in the presence of insufficient information. The most common techniques will be reviewed in the context of assessing online businesses, including a review of statistical decision making and decision trees, real options based on strategy-enabling facilitating investments, and Monte Carlo simulation. The focus will be on using these techniques to value online businesses and information-based strategies when there are no directly comparable companies and no directly relevant financial histories to study.

**Read:** *Now I Get It,* (Read Unit 11: Chapters 1 and 2. Read Chapters 4 through 6 if you are not familiar with statistical decision making and decision trees. Read Chapters 7 and 9.)

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**Unit 2 — Modeling the Impact of Information-Based Innovation**

**Session 4  W 24-Jan **Building a Simulation (1) — Thinking Like a Programmer**

*Programmers employ a structured mode of thinking to convert an incomplete or ambiguous problem statement into a complete and unambiguous sequence of well-defined, discrete, executable instructions. This structured description of the solution is generally called pseudocode, because it is largely independent of any choice of implementation language.*

**Intent:** This session is intended to begin acquainting students with going from the statement of a simulation problem to the start of a simulation implementation. The first output of the programming process is the development of a structured statement of program control and decisions, even before determining what programming language will be employed. Students will be shown how to think of the critical decisions that must be implanted in discrete event simulations, such as how to add customers to a queue with arrival rates that vary over time, when they balk (refuse to join a queue that is too long), and when they renege (leave a queue after deciding that they have waited too long). Implementing service priority rules, implementing initial and final conditions in the context of discrete event simulations will also be addressed.

**Read:** *Pseudo-code and Structured Programming (TBD / To Be Drafted)*
Control Structures in Goldsim (TBD)

Session 5 M 29-Jan Building a Simulation (2) — Combining the Goldsim Control Structures and Data Structures to Create a Complete Simulation

High level simulation languages like Goldsim have predefined control structures that correspond to all of the actions needed to construct a simulation. They have predefined data structures that correspond to all of the entities that need to be modeled in a simulation. In graphical development languages like Goldsim, each is represented by a specific icon, which can be connected graphically to complete the simulation that has initially been designed in pseudocode their pseudocode into a Goldsim implantation.

Intent: This session is intended to teach students the control structures and data structures available in Goldsim. This class will enable students to begin working on their first simulation assignment, which will be distributed after this class.

Read: Control Structures in Goldsim (TBD)
HW1: First Simulation Homework Assignment Distributed

Session 6 W 31-Jan Building a Simulation (3) — Completing the Simulation, Preparing Outputs, Testing the Findings

Once a simulation has been completed its results must be output and examined. While it is not possible to prove that a simulation is correct there are numerous techniques that we can use to determine that a simulation is behaving as we expect and to increase our confidence that its results are correct.

Intent: This session is intended to complete students understanding of going from the statement of a simulation problem to the completion of a tested and debugged simulation implementation. This will include designing the simulation to prepare the desired output and to accommodate intended use.

Read: Notes on Preparing Output and Testing Simulation Results (TBD / To Be Drafted)

Session 7 M 5-Feb Working on The Simulation Assignment — Guided Design in Class

We will discuss the assignment and will develop the overall structure for the simulation.

Intent: This session is intended to assist students in completing their simulation design and to answer questions and to address problems that are frequently encountered.

Discussion: The Design of the First Simulation
Session 8 W 7-Feb **Newly Vulnerable Online Markets**

Our second new information-based pattern: Newly vulnerable online markets, and the discussion of online grocery, online air travel, and online insurance. The importance of real, testable theory in OID, gremlins vs. surface anomalies in explaining friction, vulnerability vs. boldness in explaining eCommerce innovation. Many problems in business strategy involve the dynamic behavior of entire populations, and this is especially true in the competition between existing distribution channels and their emerging online competitors.

Intent: This session is intended to introduce students to simulating the dynamics of entire populations as they gain experience that changes their behavior.

Read: *New Patterns of Power* (Chapter 3, Section 3.6 — Pushing the Problem to its Limits: Developing the Theory of Newly Vulnerable eMarkets)

Discussion: Newly Vulnerable Online Markets — Comparing online distribution in travel and in grocery

Session 9 M 12-Feb **Discussion of First Simulation Assignment — First Assignment Due Before Class**

What has our model taught us about newly vulnerable markets and newly vulnerable online markets? What strategies, if any, would have allowed major banks have responded to the attack by Capital One? How could travel agencies have protected themselves against attack and disintermediation by major airlines?

Intent: This session is intended show students how simulations can be used to analyze different business strategies and to explore their economic impact on the firm and its competitors.

**HW2: Second Simulation Homework Assignment Distributed**

Session 10 W 14-Feb **Social Impact of Big Data, Widespread Information Availability, and Online Innovation**

Discussion of affordable care act and alternatives — the role of information, information asymmetry, and adverse selection, and the complexity of modeling workable solutions to social and strategic business problems.

Intent: This session is intended show students how simulations can be used to analyze social policies. It provides another example of modeling complex dynamic behavior of entire populations. It addresses a generalization of the model introduced by Rothschild and Stiglitz, in which the population includes more than two types of individuals, with more than two degrees of riskiness. We show how with most reasonable values for risk aversion markets will collapse if insurance companies are permitted to engage in fully individualized and fully informed pricing.
Read: Clemons, [http://www.huffingtonpost.com/entry/why-is-health-care-so-complicated-an-information-economics_us_58d43da2e4b0c0980ac0e44c](http://www.huffingtonpost.com/entry/why-is-health-care-so-complicated-an-information-economics_us_58d43da2e4b0c0980ac0e44c)

Session 11 M 19-Feb Platforms, Platform Strategies, and the Relationship Between Platform Strategy and Platform Structure
Discussion of Airbnb and Uber, the role of different platforms structures in support of different business strategies, and the social tradeoffs produced by externalities. Opportunities for further study, including OID 105 (Developing Tools for Data Analysis), OID 210 (Management Information / New Patterns of Power and Profit), OID 222 (Internet Law and Policy), OID 311 (Business Computer Languages), OID 314 (Enabling Technologies)

Intent: This session has three purposes. It provides a wrap up of much of the material covered. It uses this material in the context of assessing the need for informed public policy debate about the social impacts of new online business models. And it reviews the opportunities for additional courses in OID that are relevant to the material covered during the course.


Session 12 W 21-Feb Discussion of Second Simulation Assignment — Second Assignment Due Before Class

What have we learned about the economics of health care? Why are the individual mandate and subsidies both necessary if healthcare is to be affordable, even for the elderly and even for individuals with preexisting conditions? What business opportunities would be created if some companies could engage in full differential pricing while others followed the dictates of the affordable care act? How would this affect the ACA market offerings?

Intent: This final simulation assignment will allow students to model the dynamic behavior of entire populations over time. It may involve the dynamics are market behavior under the ACA, channel conflict, or other examples of complex behavior of entire populations.
Curriculum Vitae of
Eric K. Clemons

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website: http://opim.wharton.upenn.edu/~clemons/
personal website: http://opim.wharton.upenn.edu/~clemons/index.html

Academic Employment
The Wharton School
University of Pennsylvania
1994 - Professor of Operations Information and Decisions
1994 - Professor of Management
1981 - 1994 Associate Professor of Operations and Information Management
1989 - 1994 Associate Professor of Management
1976 - 1981 Assistant Professor of Decision Sciences

Current courses include Information: Strategy and Economics and Strategic MIS. Previous courses have included commercial data processing; systems analysis; simulation; software engineering; database systems; research perspectives in information systems; strategic business transformation, and telecommunications; and introduction to the computer as a tool.

University of Toronto Rotman School of Management
2017 Visiting Scholar
2014 Visiting Research Fellow

Peking University Law School
2013 - 2015 Visiting Research Fellow

Indian School of Business
2003 Visiting Professor of Information Systems

Hong Kong University of Science and Technology
2000, 2001 Visiting Professor of Information Systems

Cornell University
1993 Visiting Associate Professor of Information Systems
The Johnson School of Management, and
Visiting Associate Professor of O.R. & I.E.
Research on strategic impacts of information technology on production and procurement, redesign and participation in teaching of core MIS course in MBA program.

Harvard University
1984 Visiting Associate Professor
Graduate School of Business Administration
Research on telecommunications and its relationship with corporate strategic objectives, research on telecommunications to gain strategic business advantage, case writing.

Cornell University
1978, 1979 Visiting Assistant Professor of Operations Research
1975 - 1976 Instructor of Operations Research
Courses taught include an introductory freshman seminar in operations research, computer applications in industrial engineering, and special investigations in database systems.
Research Interests
Research interests address all areas of IT and business strategy, with a focus on IT and Consumer Behavior, IT and Outsourcing, and IT and Competition. Most recent work addresses questions of online business models, competitive strategy, societal impacts, and public policy. This includes the study of consumers’ preferences for privacy, the power of gatekeeper platforms like Google and Bing, externalities and potential harm from sharing economy platforms like Uber and Airbnb, and the regulatory needs for the evolving online business environment. Historically, he has studied strategies for profiting from internet applications, the changing role of internet advertising, the impact of technology on consumer choice and shopping behavior, managing the risks of strategic outsourcing, social networks, search, and the strategic implications of electronic markets for channel power and profitability. Current research addresses privacy policy, and policy for improving social welfare from innovative business models and online information-based strategies.

Teaching Interests
Information-based strategy, information economics, business judgment and problem solving, information technology and the future of law and regulation.

Education
Ph.D. 1976 Cornell University
- Operations Research
  - Dissertation: Design of a User-Interface for a Relational Data Base
  - Major Field: Information Processing
  - Minor Field: Operations Research, Applied Mathematics

M.S. 1974 Cornell University
- Operations Research

S.B. 1970 Massachusetts Institute of Technology
- Physics

Professional Activities
Co-Chair, Workshop on The Future of Internet Law and Regulation in China, Peking University Law School, Summer 2013.
Session Chair, Asia Forum on Cyber Security and Privacy, Cloud and Big Data: Challenges for Policy Making, Tokyo, Japan, May 2013.
Keynote Speaker, Asia Forum on Cyber Security and Privacy, Seoul, Korea, October 2012.
Speaker, Beijing Forum, Beijing, China, 2011.
Member, Advisory Board, Congressional Office of Technology Assessment Study of Securities Markets and Information Technology, 1988 - 1990.
Member of Association for Computing Machinery, Member of ACM National Council, 1986 - 1990.


Member of CODASYL Data Description Language Committee, 1980-1982.

Program Coordinator for Software Tutorials, Fifth International Conference on Very Large Data Bases, 1979

Program Committee for NCC 81 in area of Software Engineering

Program Committee for VLDB 1982

Program Committee Vice Chairman for NCC 82

Advisory Council for DSS 1982

Program Committee for the 8th International Conference on Information Systems, 1987


University Activities

Founder, Project Director, and Principal Investigator for research effort in Information, Strategy, and Economics, with the Reginald H. Jones Center at the Wharton School (1985 - present). Project is a collaborative effort with numerous industrial sponsors, to perform empirical and theoretical research. Area coordinator, Information, Strategy, and Economics, from its inception in 1997 to present. Associate Director, MBA eCommerce Program, 1999-present.


Professional Experience

Consulting practice focuses on assessing the competitive implications of information technology, examining industrial restructuring enabled by technology, and managing the risk of large-scale implementation efforts. Recent work addresses implementation of effective information-based marketing strategies to exploit differences in customer profitability, managing the risk of outsourcing and alliances, implementing strategic business transformation during periods of strategic uncertainty, and development of long-term strategies for transition to eCommerce. Studies have been for both the public and private sectors, and have included work with major stock exchanges, consumer payment systems, consumer packaged goods manufacturers, and international consulting firms. Executive education experience has been with senior executives and senior systems officers, in systems and in competitive strategy, both domestically and abroad. Professional speaking engagements have included keynote addresses and opening and closing remarks at high level executive sessions in the U.S. and abroad.

Work in Progress

1. Oh, Yeah, Now I Get It: Learning to solve really complicated problems in business, in society, and in life, (Eric K. Clemons) (text for teaching business analytics, executive judgment, and information-
based strategy) (manuscript currently about 80% completed)
3. Academic program in Information, Innovation, Competition, and Regulation, for senior party members of the Communist Party of China. Topics covered focus on business strategy, competition, and rule of law, with a focus on the impacts of modern information technology. Program is taught at Peking University. Co-directed with Professor SHAO Jingchun, Chairman, International Economic Law Institute, and Director, WTO Law Study Center, Peking University Law School. Successfully taught the first four pilot modules. Program is currently on hold, because of the political climate in China.

Journal Publications


48. “Business Models for Monetizing the Internet: Surely There Must be Something other than


**Refereed Conferences**


Proceedings, 10th International Conference on Information Systems, December 1989, pp. 341-351.


25. “eCommerce and eDistribution: The Role of Power When Selecting Alternatives Channel Strategies”, (Eric K. Clemons, Bin Gu, Michael C. Row), WISE 2000, Melbourne, Australia (No proceedings)


51. “Self-Regulating Public Servant, Profitable Internet Innovator, or Rapacious Monopoly: Assessing Google, Thinking About the Possibility of Regulation”, (Eric K. Clemons, Steve Barnett, Rajiv Gokal,


Invited Papers / Book Chapters


36. 共振营销：互联网信息资源带来的商业机会 — The Business Opportunities Created by Online Information Sources: Using Consumer Certainty to Create Consumer Purchases, Consumer Delight, and Corporate Profits, China Long March to Quality <<中国质量万里行>> August 6, 2012.


Trade Publications
17. FT Survey on Mastering Uncertainty, “Past experience points the way to the future”, March 16, 2006, pp. 6-8.

Online Publications
10. Finance: Cleaning Up After the ‘Perfect Storm’”, BusinessWeek.com, April 2, 2009,
http://www.businessweek.com/investor/content/apr2009/pi20090401_953227.htm?chan=top+news+index+-+temp_investing.
11. “Obama and the Middle East: Complex Systems, Poorly Planned Interventions, and The Law of
Unintended Consequences”, (Eric K. Clemons, Elizabeth T. Gray), April 21, 2010,
13. “Why Punitive Damages Against BP Wouldn’t be Punitive at All”, (Eric K. Clemons, Steve Barnett)
14. “We need to Change Copyright Laws to Save Newspapers”, (Eric K. Clemons, Nehal Madhani),
15. “Time to Wake Up and Smell the Antitrust”, Huffington Post, September 21, 2010,
17. “Inside The Bidding Wars Behind Online Search Words “, October 14, 2010,
19. “Quick, Is Someone Trying to Steal your Agora?”, Huffington Post, December 22, 2010,
http://www.huffingtonpost.com/eric-k-clemons/quick-is-someone-trying-t_b_800536.html.
Clemons, Julia C. Clemons, Elizabeth T. Gray Jr.) February 10, 2011
23. “The Real and Inevitable Harm From Vertical Integration of Search Engine Providers Into Sales and
25. “Introduction to Cloud Computing”, Huffington Post, 13 May 2011,


Working Papers
1. "Home Network Design: An Exact Solution to an NP-complete Optimization Problem Exploiting Structure and Semantics", (Matthias Berger; Eric K. Clemons; Thomas Hess; Christian Matt).
Grants Received

Collaborative U.S.-U.S.S.R. Research in Multiple Data Base Schemas, National Science Foundation Grant No. MCS77-18108, July 1977.

NSF Summer Travel Grant MCS78-20834, to attend conference in Haifa, Israel.


Sloan Foundation Grant from Wharton Financial Institutions Center to Study Outsourcing of Systems in Financial Services Firms, 1993.


Microsoft Grant for the Study of Online Privacy and Competition, 2012-2016.