MIS 381N.4 Decision Support Systems- Preliminary
Fall 2010, Unique Number 04025
CBA 5.154
Wednesday 11AM-2PM

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Course Objective

This research seminar is intended to provide doctoral and MBA students a perspective on how information technologies impacts decision-making. During the course of the semester we will learn how to elaborate innovative business models for companies that are currently dominating the field (Google, Amazon, Twitter) to increase profitability while providing customers with better service. This course takes a techno-economic approach in that it emphasizes the incentives underlying the interaction of agents integrated by technology. While disciplines such as computer science analyze the design of information technology, i.e. the manner in which information exchange is affected, this course takes a techno-economic approach in that it emphasizes the incentives underlying the interaction of agents integrated by technology. A software engineering perspective or a view of the cognitive processes underlying information technology acceptance is not revealing of the incentive alignment in information systems, i.e. whether the system has features that will induce the users to use it in a manner consistent with its intended use. For instance, even when the underlying technology is reliable, a complete understanding of the decision support system needs an analysis of the impact of the system on the retrieving agents and the motives of the agents in interacting with the DSS. Examples of this include corporate governance and the accounting system or customer behavior and the impact of company pricing and reward structure.

Electronic markets support decisions by sellers and buyers in terms of pricing and allocation. The auction technology has to be designed to recognize the natural behavior of the agents, including actions that can be taken that would not be possible in a face-to-face non-technological encounter. Information technology also creates unique situations such as sellers posing as buyers in auction markets and attempting to manipulate prices in their favor. Through the discussion of a selected set of research topics such as the above, each student is expected to develop a broad understanding of the research issues as well as research methodologies, which can serve as a foundation for her/his in-depth research into specific frontier issues in the digital economy. We will also discuss some contemporary topics using Harvard Business School cases.

Moreover, we will study social networks such as Twitter, Facebook and Second Life through the aspect of identity vs. anonymity to determine the impact they have had on today's business world. We will illustrate how to use social networks to conduct research on a number of subjects of interest in the field.

Course Description

The first set of topics give an **Overview of IS Research**. The *scope* of IS research, as well as various *theoretic* and *empirical methodologies* will be extensively discussed.

The second set of topics are devoted to **Social Computing and Online Communities**, which have ushered in a new era of the web, where information and communication technologies are facilitating organized human endeavor in fundamentally new ways. Topics involving *trust and reputation*, *keyword auction advertising*, *interactive game*, *blogging*, *information search* and *market matching* will be covered in class.

The third set of topics relates to **Knowledge Management**. We will talk about the new economic perspectives on the IT-facilitated knowledge creation, integration, transfer and outsourcing. The impact of *knowledge management* on future organizational structures and *bundling* strategies will also be discussed.

The fourth set of topics explores various aspects of **Network Engineering**. Although the Internet is developing at an unprecedented speed notably in terms of user-generated content, its inherent distributed organizational structure endangers its viability. How to manage and organize the Internet effectively and efficiently is a critical issue. In this section, mechanism design on *distributed computing* and *Internet security* as well as auditing models and various issues in *peer-to-peer networks* will be discussed.

Grading

Course grading will be based on class participation, team discussion reports, and an individual term paper.

Class Participation (10%)
Since every lecture involves extensive discussions and presentations, students are required to attend each lecture promptly. Absence without proper reasons will considerably affect the final grade. Students are encouraged to actively participate the in-class discussion and raise up any thought provoking question.

Team Discussion Reports (45%)
We will have five topic discussions with related to topics covered in class. Each of them counts 9%. For each discussion session, case material and discussion questions are posted on the class website at least one week ahead. Reading assigned materials and preparing the questions before class are crucial to understanding topics.

Individual Term Paper (45%)
Students are required to write a term paper on a topic of their choice related to the digital economy. Each student is encouraged to discuss his/her topic with the instructor as early as possible and get some feedback from the instructor. All Ph.D. students are required to turn in a short description of the research question before October 12th. The final term paper is due and will be discussed in the mini-workshop session in the last class.

Background Readings
(The following books can help students get a better understanding about the issues discussed in the class.)

1. Mas-Colell, A., M.D. Whinston and J.R. Green, 1995. Microeconomic Theory, Oxford University Press.

2.   Choi, S.-Y., D.O. Stahl and A.B. Whinston, 1997. The Economics of Electronic Commerce: The Essential Economics of Doing Business in the Electronic Marketplace, Macmillan Technical Publishing.

3.   Gibbons, R., 1992. Game Theory for Applied Economists, Princeton University Press.

4.   Tirole, J., 1988. The Theory of Industrial Organization, MIT Press.

5.   Hendershott, T., 2006. Handbooks in Information Systems, Volume 1: Economics and Information Systems, Elsevier.

Online Resources

All course related materials can be found online in the Blackboard system (http://courses.utexas.edu), including lecture slides on each topic, relevant research papers, electronic versions of reference books, latest business stories on newspapers, etc.

Moreover, interesting articles will be posted through the Center for Research in Electronic Commerce's twitter account (@CREC_UT), as well as its Facebook page where students are encouraged to post interesting articles and start discussions. CREC's Facebook page can be found here: http://bit.ly/7PSyK

Scholastic Dishonesty

The McCombs School of Business has no tolerance for acts of scholastic dishonesty. The responsibilities of both students and faculty with regard to scholastic dishonesty are described in detail in the Policy Statement on Scholastic Dishonesty for the McCombs School of Business:

By teaching this course, I have agreed to observe all of the faculty responsibilities described in that document. By enrolling in this class, you have agreed to observe all of the student responsibilities described in that document. If the application of that Policy Statement to this class and its assignments is unclear in any way, it is your responsibility to ask me for clarification. Policy on Scholastic Dishonesty: Students who violate University rules on scholastic dishonesty are subject to disciplinary penalties, including the possibility of failure in the course an/or dismissal from the University. Since dishonesty harms the individual, all students, and the integrity of the University, policies on scholastic dishonesty will be strictly enforced. You should refer to the Student Judicial Services website at http://deanofstudents.utexas.edu/sjs/ or the General Information Catalog to access the official University policies and procedures on scholastic dishonesty as well as further elaboration on what constitutes scholastic dishonesty.

Special Accommodations

The University of Texas at Austin provides upon request appropriate academic accommodations for qualified students with disabilities. For more information, contact the Office of the Dean of Students at 471-6259, 471-4641 TTY.

Topics for Presentation and Course Schedule*

*The slides for each class will be available on Blackboard after class

Aug 25	**Course Overview**
	This session is to give students an overview of this course, including what topics are discussed in the class, how the students are going to be evaluated, and the importance of this course for

	IS doctoral students. <u>Reference:</u> 1. Peter Senge & Goran Carstedt, on Innovating our way to the next industrial revolution, MIT Sloan Management Review, Winter 2001, Vol. 42, No. 2, pp. 24–38 2. Clayton Christensen on The past and future of competitive advantage MIT Sloan Management Review, Winter 2001, Vol. 42, No. 2, pp. 105–109
Sept 1	**DSS View of Design of New Technology** Online search advertising, in which advertisers bid to be listed alongside search results or content pages for specific keywords, has been recognized as a successful revolution of the traditional online and offline advertising. To determine the optimal bidding strategy, advertisers not only need to consider the competitive situation (i.e., how many competitors and whom exactly they are competing with), they also need to take into account consumers' online search behavior and many other factors. How to properly evaluate the per-click value of sponsored ads should thus be of central interest to online marketing managers. We propose game-theoretic models to endogenously investigate the value of sponsored ads as a result of price competition, taking into consideration consumers' online search behavior, industrial structure, as well as possible impacts from the organic lists. The birth of new forms of communication has completely revolutionized the way customers, shop as well as the way companies reach out to them. Throughout the semester we will look at these new online communities in detail, however, this session is meant to give students an overview of how sites such as Twitter, Facebook, LinkedIn and Amazon have gained popularity, and what makes them game-changers. Moreover, we will look at ways to use social networks to conduct market research, and different types of field experiments. We will study a model developed by CREC which uses Twitter to predict sales of movies. <u>References:</u> Rui, Whinston, Winkler "Follow the Tweets", *The Wall Street Journal*, November 30, 2009 Carrington P, Scott J, Wasserman S, <u>Models and Methods in Social Network Analysis</u>, Cambridge University Press, 2005. Jackson, Matthew O, <u>Social and Economic Networks,</u> Princeton University Press, 2008 **Harvard Business School cases:** LinkedIn Corp., 2008 Facebook's Platforms Leadership Online (B): Barnes & Noble vs. Amazon.com in 2005
Sep. 8	**Introduction to Game Theory** <u>Reference:</u> 1. Gibbons, R., 1992. Game Theory for Applied Economists, Princeton University Press. 2. Fudenberg, D. and Tirole, J, 1991, Game Theory 3. Xu, H., Stinchcombe, M.B., Whinston, A.B. 2010. Aspects of the Market for Certification. Working paper.

Sep. 15	**Game Theory**
	References:
	[1] V.P. Crawford and Sobel J. 1982. "Strategic Information Transmission," *Econometrica*.
	[2] C. J. Lee and Gu Z. 1998. "Low Balling, Legal Liability and Auditor Independence," *The Accounting Review*
	[3] R. Schwartz. 1998 "Auditors' Liability, Vague Due Care, and Auditing Standards," *Review of Quantitative Finance and Accounting*.
	1. Gibbons, R., 1992. Game Theory for Applied Economists, Princeton University Press. 2. Fudenberg, D. and Tirole, J, 1991, Game Theory
Sep 22	**Aspects of Markets for Certification**
	How to credibly communicate information is crucial in many business scenarios that resemble a sender-receiver framework. The issue is typically dealt with by means of third party opinions or legal enforcement. For example, firms hire auditors to certify their financial statement so as to convince investors about their financial performance; bond managers rely on rating agencies such as Standard & Pool and Moody's to reassure investors about their high return; book authors, restaurants, movies etc. gain publicity very often through reviewers' and critics' comments. In all examples, an information sender tries to convince a group of receivers about their value and hence influence their purchasing decisions. Without mediation of a third party, the information becomes cheap talk, and will be discarded by receivers. In this research, we focus on the role of audit in assisting information transmission in a firm-investor setting. We are interested in several aspects of auditing: (1) Strategically truthful audit; (2) The payment contract between firms and auditors; (3) The consequences of firms, instead of investors, paying auditors; (4) The role of auditors' liability; (5) The relational contract between firms and auditors, as well as (6) Firms' selection of auditors. We essentially intend to design an audit mechanism that ensures credible and effective information communication.
Sept 29	**Intro to social Network Theory**
	Empirical research methods are a class of research methods in which empirical observations or data are collected in order to answer particular research questions. While primarily used in academic research, they can also be useful in answering practical questions. Empirical research normally starts with some a priori theory, which the researcher develops to try to explain and/or predict what happens in the real world. The purpose of the research is to test the theory and possibly refine it. Modern technology allows us to collect data sets that are bigger than ever before and thus present new challenges.
	1.Data collection and management is an important part of empirical research in the IS field. What theories we can test depends crucially on what data we can get. We use Twitter and other social networking sites to illustrate these opportunities and challenges. In class, we will learn how to collect data from Twitter and how to address some of the challenges that arise while doing so. We will learn how to use the site's open API to build a program that collects and stores the data. This is not only interesting in terms of academic research, but can be invaluable for companies wanting to keep track of what is being said about it or its products.

Reference:
1. Shim, Lee, Whinston, "Does Lower Transaction Price Attract More Customers? An Empirical Study on the Short & Long-Term Impacts of Online Brokerage Services", forthcoming
2. Meng Ma and Ritu Agarwal, "Through a Glass Darkly: Information Technology Design, Identity Verification, and Knowledge Contribution in Online Communities", Information Systems Research, 18(1), March 2007, 42-67.
3. Duan, Gu, Whinston, "Informational Cascades and Software Adoption on the Internet: An Empirical Investigation", MIS Quarterly, 32(4), December 2008
4. Huaxia Rui, Hong Xu, Andrew B. Whinston, "A Platform of Data Acquisition Management and Visualization for Empirical Research in IS", submitted to WITS 2009
5. Bandiera, O., I. Rasul. 2006. Social Networks and Technology Adoption in Northern Mozambique. *Economic Journal* 116: 862-902.
6. Bramoulle, Y., Djebbari H., B. Fortin, (2009), "Identification of peer effects through social networks,"*Journal of Econometrics*, 150(1): 41-55
7. Easley, D., J. Kleinberg. (2010). *Networks, Crowds, and Markets: Reasoning About a Highly ConnectedWorld*. Cambridge University Press
8. Freeman, L.C. 1979. Centrality in social networks: A Conceptual clarification. *Social Networks* 1:215-39
9. Granovetter, M. 1973. The strength of weak ties. *American Journal of Sociology*, 6: 1360-1380.
10. Liu, H., Maes, P., & Davenport, G. (2006). Unraveling the taste fabric of social networks. *International Journal on Semantic Web and Information Systems*, 2 (1), 42-71
11. Oestreicher-Singer, G. and Sundararajan, A., 2008. "The Visible Hand of Social Networks in Electronic Markets", working paper, NYU
12. Wasserman, S., K. Faust. 1994. *Social Network Analysis: Methods and Applications.* Cambridge University Press, Cambridge.

Oct 6	**Making Careers off Video Creation on YouTube** On July 9th, 2010, YouTube launched a $5 million grant program for content creators from its three-year-old YouTube partner program. The $5 million in grant money, in addition to current ad-revenue sharing, is set aside by YouTube's owner, Google, to encourage creative content production. As said by George Strompolos, partner development manager at YouTube, "People are making careers off this." Ever since 2005, YouTube is all about user-generated content. Therefore, YouTube has long been criticized for poor quality and low influence of amateur videos due to the lack of money for facilities and marketing investment. In order to compete with premium video sites like Hulu, ad-revenue sharing and the grant program are monetary incentives for talented YouTube partners to be more engaged in content creation, production and marketing business. Before the grant program, YouTube partners will make $2.5 to $5 per 1000 video views, $0.05 per subscriber, and $0.01 per channel view. The grant program is just another strong stimulus for YouTube users who are dreaming of big success since the cold, hard cash makes the dreams much more real. Career opportunities are not limited to as YouTube partners. YouTube, as a powerful video platform, also attracts attention from industries and creates career opportunities at other organizations for video providers. To succeed on YouTube, good reputation is what the video providers are working for. A provider's reputation directly influences audience attention and engagement for her and her videos. Audience attention and engagement in turn determines her video views and subscribers, upon which the provider are evaluated toward the grant and most importantly, the

	success as a video provider. Reputation system is designed to make reputation information available to viewers and help them make decisions. While the proliferation of social media provides content consumers with a great variety of information sources and alternatives, it results in severe information overload problem. It is also riddled with uncertainty in information quality and credibility. Reputation can be considered as an important uncertainty-reducing mechanism. It summarizes providers' past strategic actions and content performance, assists the evaluation towards their future actions and performance, and facilitates viewers' decisions based on the evaluation. Following is a valuable yet costly asset in that it takes time and efforts to build. Providers have to devote their efforts to content contribution. Video production is necessary for providers to reach viewers and transform as many viewers as possible into their subscribers. The ultimate outcome of this social learning process is match between content (or content providers) and content consumers. **References:** Susarla, A., Oh, J., Tan, Y. "Social Networks and the Diffusion of User-Generated Content: Evidence from YouTube," *Information Systems Research*, forthcoming
Oct 13	**Tweeting, Retweeting, and Geotagging** Over the past few years, Twitter has been changing the way people interact online. Often referred to as a social network, it is more of a social broadcasting tool. The openness of the network has allowed people to connect with individuals they would not usually have contact with and has completely shifted the way companies communicate with customers. By observing interactions within Twitter we can identify influencers, watch as word of mouth develops, and through geotagging, get an idea of who is saying what and where. Reference: 1. Teddy Wayne, "On Twitter, a Close Knit Network" *The New York Times,* July 4, 2010. 2. Danah Boyd, Scott Golder, Gilad Lotan, "Tweet, Tweet, Retweet: Conversational Aspects of Retweeting on Twitter," hicss, pp.1-10, 2010 43rd Hawaii International Conference on System Sciences, 2010 3. Huaxia Rui, Andrew Whinston and Elizabeth Winkler, "Follow the Tweets", MIT Sloan Management Review, Nov 30, 2009 4. D Zhao, MB Rosson, "How and Why people Twitter: the role that micro-blogging plays in informal communication at work", Proceedings of GROUP 2009 (pp. 243-252).
Oct 20	**Keyword Auction Advertising & Location Choice in Online Advertising** Auctions have been a common form of market mechanism for many centuries, although systematic academic examination began only several decades ago. In this lecture, we are exploring some new auction mechanism under the ecommerce setting. One is the auctions for keyword adverting, which is offered on major Internet search engines, e.g. Google, Overture, Yahoo, MSN. In this radical new way of online advertising model, not only can advertisers specify under which search term they want their advertisement to appear but also specify how much they are willing to pay for every single click as their bids. Meanwhile, the search engines can observe every advertiser's past performance, i.e., how

	many clicks every advertiser gets. How to incorporate bidders past performance information into auction mechanism would be an interesting and challenging question. Another is about high-tech procurement auctions. Due to the high uncertainty of future, the utility of desired product/service depends on the realized state. In addition, suppliers, as the experts in a specific field, have better understanding of the technology trend and future states. How to elicit suppliers' predictions about future, and incorporate them into decision-making process is our basic concern. Reference: 1.Andrew B. Whinston, "How to Slice the Pie? Optimal Share Structure Design in Internet Advertising Auctions", Google Tech Talks, June 2008. http://www.youtube.com/watch?v=-NuZn64Ma2E 2.Chen, Liu, Whinston, "Auctioning Keywords in Online Search", Journal of Marketing, March 2009 3.Chen, Liu, Whinston, "Ex-Ante Information and the Design of Keyword Auctions", Forthcoming at *Information Systems Research* 4.Xu, Chen, Whinston, "To Place Better or Price Cheaper? Evaluating Prominent Position in Price Competition" Newspaper Stories 1. "Google unveils YouTube advertising format", *Financial Times*, Aug 22, 2007. 2. "MySpace Mining Member's Data to Tailor Ads Expressly For Them", *The New York Times*, Sep 18, 2007
Oct 27	**Introduction to Internet Security** Various malicious activities in the form of viruses, worms, Trojans, spam, phishing, hacking attacks, Distributed Denial of Service (DDoS) attacks, spyware, and adware have proliferating over the Internet in recent years. The Internet security has become the major concern of organizations and individuals, and various regulations and technologies have been deployed to safeguard the Internet. However, the effectiveness of most approaches does not meet expectations because of the extremely distributed organizational structure of the Internet. In this paper, we propose a mechanism which introduces a novel electronic business, a Certification Authority (CA), to provide Internet Service Providers (ISPs) with appropriate incentives to invest in more efficient controls for the benefit of the whole Internet community. We use a game-theoretic model to validate our mechanism. The results show that the proposed mechanism is sustainable; it can induce ISPs to invest in controls for outbound traffic which are more efficient than the inbound traffic controls predominantly deployed these days; it can improve the overall system surplus. Reference: 1. Thede Loder, M.V.A., Rick Wash, Information Asymmetry and Thwarting Spam. http://ssrn.com/abstract=488444, 2005. 2. Benjamin J. Kuipers, A.X.L., Aashin Gautam, Mohamed G. Gouda, Zmail: Zero-Sum Free Market Control of Spam. *Working Paper*, 2004 3. Huang, Y., X. Geng, and A.B. Whinston, "Network Mapping Services for Dynamic Selection of Web Services: Promises and Challenges," Information Systems and E-Business Management, Oct. 2005 4. Manoj, P., X. Zhao, A.B. Whinston, and F. Fang, "Reengineering the Internet for Better Security," IEEE Computer Security, 2007 5. Zhao, X., F. Fang, and A.B. Whinston, "An Economic Mechanism for Better Internet

	Security," Working paper 6. Parameswaran, Whinston "Incentive Mechanisms for Internet Security", Handobooks in Infroamtion Systems, Vol 4.
Nov 3	**Market Design for Knowledge Products** In many scenarios, information held by individual agents needs to be elicited and collected to generate accurate forecasts. In this section, we explore various incentive mechanisms which improve the effectiveness of information elicitation and transfer and thus guarantee the accuracy and reliability of the forecast. We begin our review by first looking at the new forms of e-markets in which people can trade contingent future contracts based on future uncertain events. The typical market includes Iowa Electronic Market (http://www.biz.uiowa.edu/iem/) and the Hollywood Stock Exchange Market (http://www.hsx.com). We will discuss the underlying theory supporting the predictability of such a market mechanism and review the related literature on those prediction markets. Then we will introduce another research direction on how to generate reliable business forecasts, which focus more on direct information elicitation mechanisms. We conclude this section by comparing the market mechanism vs. the information elicitation mechanism. Reference: 1. Fang Fang, Maxell Stinchcombe, Andew Whiston, "Put your money where your mouth is – A betting platform for better prediction," Review of Network Economics, June 2007 2. Yossi Sheffi, DAY SIXTEEN: A demand for steady supply- Managers can minimize the forecasting risks that leave stores empty - or overstocked - at crucial times, Financial Times, August 8, 2005 3. Kay-Yut Chen and Charles R. Plott, ``Information Aggregation Mechanisms: Concept, Design and Implementation for a Sales Forecasting Problem'', Working Paper, 2002 4. K.Y.Chen, L.R.Fine and B.A.Huberman. 2004. Eliminating Public Knowledge Biases in Information-Aggregation Mechanisms. Management Science. 50(7). pp. 983-994 5. D.M. Kilgour and Y. Gerchak. 2004. Elicitation of Probabilities Using Competitive Scoring Rules. Decision Analysis. 1(2) pp. 108-113. 6. Justin Wolfers and Eric Zitzewitz. 2003. Prediction Markets. Forthcoming in Journal of Economics Perspectives. 7. O'Hara, M. (1995) *Market Microstructure Theory*. Cambridge, Mass. 8. Spann, M. and B. Skiera. 2003. Internet-Based Virtual Stock Markets for Business Forecasting. Management Science 49(10) 1310-1326. 9. Thomas Davenport on How do they know their customers so well? MIT Sloan Management Review, Winter 2001, Vol. 42, No. 2, pp. 63–73 10. Ba, S., Y. Stallaert, and A.B. Whinston, "Optimal Investment in Knowledge within a Firm Using a Market Mechanism," Management Science, 2001 11. Chen, Ingersoll Jr., Kaplan, "Modeling a Presidential Prediction Market," Management Science, 2008. Newspaper Stories "The Wisdom of Sales Trend Predictions", *The New York Times*, Sep 17, 2007
Nov 10	**Algorithmic Trading** Algorimic trading uses computer programs for entering trading orders. Algorithms decide on things such as the timing, price, or quantity of the order. Pension funds, mutual funds, and other buy side (investor driven) institutional traders.We will also study elements of High Frequency Trading (HFT), and how to process the information needed to do so.

Nov 17	**Healthcare** The astronomically high healthcare costs have become a national focal point in the U.S. Economists argued that the U.S. healthcare industry is possibly the last large "cottage industry" that is plagued with inefficiency due to the lack of a transparent market. The current U.S. healthcare market has two built-in moral hazards because of information asymmetry that lead to inefficient resource allocation: the moral hazard from healthcare providers and the moral hazard from consumers. We need a better mechanism that would provide both the healthcare providers and patients incentive to take proper actions. Information technology (IT) have transformed many other industries by vastly improving information transparency and market efficiency. With the recent national outcry against out-of-control healthcare costs and major push from the federal government, it is the time to finally ripe for deploying information technology to build a more efficient market mechanism for healthcare services.
Nov 24	**Mini Conference** – Student presentations
Dec 1	**Mini Conference** – Student presentations