Summary of Panel Proposal

Title: **Industry Emergence: Institutional Entrepreneurship and the Commercialization of the Internet, 1993-2004**

Organizers: Thomas Haigh, University of Wisconsin-Milwaukee & David Kirsch, University of Maryland

Chair: TBA.

Commentator: David Sicilia, University of Maryland

Session Abstract: Please see over.

Papers:

> "Innovation and the Evolution of Market Structure for Internet Access in the United States," Shane Greenstein, Northwestern University
>
> "Small Ideas, Big Ideas, Bad Ideas, Good Ideas: Characterizing Dot Com Venture Creation," David Kirsch and Brent Goldfarb, University of Maryland
>
> "The Web's Missing Links: The Search Engine & Portal Industry," Thomas Haigh, University of Wisconsin, Milwaukee & The Haigh Group

Session Abstract

Industry Emergence:
Institutional Entrepreneurship and the Commercialization of the Internet, 1993-2004

Entrepreneurship occurs in multiple contexts and contributes to a host of economic activities. The emergence of new industries is one of the most important. Contemporary capitalism traces the arc of these new economic sectors – from the first industrial revolution through electrification, motorization, the jet age, and the solid state revolution. At each of these junctures, entrepreneurs have been the agents of social and economic change, but not always in the ways imagined in the cultural mythology of entrepreneurship. By definition, industries are collections of economic actors, requiring the engagement of multiple entrepreneurial actors, alternately competing and cooperating. Industry emergence results from complex actions; economic sociologists have termed this process "institutional entrepreneurship." In this panel, we will explore an important, recent instance of industry emergence, the commercialization of the internet. In the 1990s, accepted institutional forms emerged from the complex interactions among thousands of entrepreneurial agents. This session presents three perspectives on the recent history of the commercialization of the Internet, from the opening of the Internet to commercial Internet Service Providers in 1993 to the Google IPO in 2004.

Greenstein's paper lays the groundwork for the session by describing the commercialization of Internet access services. The nascent Internet service market of 1993 had changed beyond recognition a few years later, but Greenstein draws on a rich body of statistical and case evidence to chart the evolution of the new industry. He explores the role of regulatory agencies and of structures inherited from the existing computing and communications industry in directing its evolution.

The rapid spread of Internet access created opportunities for thousands of new "dot com" businesses working in many niches. Kirsch & Goldfarb lay out the general landscape of technology entrepreneurship in the internet era. Exploiting a unique database of business planning documents from a venture capitalist that invested in internet startups, their paper estimates the number of new ventures that were formed to exploit the commercialization of the internet from 1994-2001. The paper also reports on the outcomes of these ventures.

Haigh focuses on a particular Internet industry: web navigation firms such as Yahoo and Google. He examines the history and structure of the web, to show that these firms provided the crucial "missing links" omitted from its initial design. In analyzing the transformation of early web search firms into internet portals, he documents the importance of the dot com boom (with its focus on quick IPOs, rapid user growth and rosy projections) in pushing these firms toward what proved a disastrous strategy for the industry. Google, which defied the conventional wisdom of the boom years, eventually established web search as one of the most profitable and strategically located Internet businesses.

Our respondent will connect the papers to larger themes in the business history literature.

Innovation and the Evolution of Market Structure for Internet Access in the United States

Shane Greenstein
Northwestern University

Topic: How and why did the U.S. commercial Internet access market structure evolve during its first decade?

Argument: Commercial Internet access market structure arose from a propitious combination of inherited market structures from communications and computing, where a variety of firms already flourished and entrepreneurial norms prevailed. This setting nurtured innovative behavior across such key features as pricing, operational practices, and geographic coverage. Inherited regulatory decisions in communications markets had a nurturing effect on innovative activity. On-going regulatory decisions also shaped the market's evolution, sometimes nurturing innovation and sometimes not.

Evidence: The paper draws on a combination of anecdotes, statistics, and case material from a wide variety of sources including FCC filings, on-line and print news stories, industry publications, and prior statistical studies of the Internet Service Provider industry by the author.

Contribution: As in Aspray (2004), the narrative and analysis follow events that came after those chronicled by Abbate (1999). However, it concentrates its attention on events in Internet access markets, which has not received as much attention. This essay seeks to make the relationship between market structure and innovative behavior more central to writing about the history of the Internet access. It goes beyond the issues as found in Greenstein (2005) and Nuechterlein and Weiser (2005), putting many sources about the building of the commercial network together in one place in an accessible format. This emphasis amplifies the contributions of both successful and failed entrepreneurial firms, the lessons learned during competition between incumbent firms and innovative entrants, and the consequences of regulatory decisions for entrepreneurial activities. It informs conjectures about several unique features of U.S. market structure and innovative behavior. It also informs policy debates today about the role of regulation in nurturing or discouraging innovation behavior.

Abbate, Janet, 1999, *Inventing the Internet*, MIT Press; Cambridge, MA.

Aspray, W. 2004. *Chasing Moore's Law: Information Technology Policy in the United States.* SciTech Publishing; Raleigh, NC.

Greenstein, Shane, 2005, "The Economic Geography of Internet Infrastructure in the United States," In *Handbook of Telecommunications Economics*, Vol. II, eds. Martin Cave, Sumit Majumdar and Ingo Vogelsang, Elsevier Publishing.

Nuechterlein, J E. and Weiser, P. J., 2005, *Digital crossroads: American telecommunications policy in the Internet age*, Cambridge: MIT Press.

Small Ideas, Big Ideas, Bad Ideas, Good Ideas:
Characterizing Dot Com Venture Creation

David Kirsch and Brent Goldfarb
Robert H. Smith School of Business
University of Maryland, College Park

Topic: How many technology ventures were created to exploit the commercialization of the internet during the Dot Com Era and what happened to them?

Argument: Most prior studies of Dot Com venture creation have focused on the small subset of ventures that received private equity from venture capital investors and later pursued initial public offerings of stock. These firms were not necessarily representative of the overall population of technology startups created to commercialize the internet. Moreover, the highly publicized failure of a set of these firms gave rise to the conventional wisdom that the Dot Com era was a bust. While not disputing the enormous paper losses that many investors suffered from the collapse of internet stocks, we find a five-year survival rate among the estimated 50,000 internet ventures created from 1994-2001 of 48%. This figure is consistent with the survival rate of new ventures in other periods of industry emergence.

Evidence: The paper exploits a unique database of business planning documents salvaged from the Dot Com era (www.businessplanarchive.org). A subset of the Archive was identified as the full sample of solicitations submitted to a single venture capitalist. The study takes advantage of the representativeness of that sample to make estimates about the total population of Dot Com firms.

Contribution: With the exception of other papers in the panel (Greenstein, 2006), this study is the first to look at a full cross-section of internet startups rather than the small subset that received venture capital and listed securities on public markets. The fact that 48% of new entrants survived suggests that our view of the era should be revised. Whereas prior studies have, in effect, argued that bad ideas were marketed to gullible investors as good ideas, we suggest that good ideas were marketed to investors as big ideas. Financial returns were poor, but many of the businesses succeeded.

The Web's Missing Links: The Search Engine & Portal Industry

Thomas Haigh
University of Wisconsin, Milwaukee & The Haigh Group

Topic: The evolution of the web navigation industry. This was created in the mid-1990s by web directory firms (Yahoo, Magellan) and search engines (Excite, AltaVista, Lycos, Infoseek). By the late 1990s, both classes of firm were attempting to remake themselves as web portals, offering integrated and personalized access to a wide range of services. Few portals survived the collapse of the dot com boom, but in recent years Google has led the resurgence of web search, combining an innovative method of prioritizing its results with a highly effective system for auctioning advertising on keywords.

Argument: The history of technology matters to this story, because subtle design choices taken during the pre-commercial period of the Internet and by Tim Berners-Lee in the original design of the net created a need for specialist navigation services and largely determined viable business models. But the less rational aspects of business history also matter – I argue that only the unusual behavior of venture capitalists and investors during the late 1990s can explain the suicidal determination of early search firms to become portals. The combination of these two arguments leads to a third: that the evolution of this industry was driven by interactions between the computer science and engineering culture of the pre-commercial Internet and attempts by portal company leaders to duplicate the practices and models of existing media companies.

Evidence: Newspaper articles, books, trade press sources, Internet design documents, early sources describing web user behavior, technical literature on information retrieval systems.

Contribution: Existing work on the topic is all by journalists, including several books on Yahoo and Google. While my work is based on secondary sources it goes beyond these accounts in its synthetic breadth, its adoption of a business history framework (focus on business models, barriers to entry, institutional evolution, etc), and its comparison of the web with earlier electronic publishing systems to draw connections between the distinctive technological choices made by internet designers and the new business niches that emerged for web navigation firms.

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Professional Positions at Universities

- *2001 - present*, Elinor and Wendell Hobbs Professor of Management and Strategy;

Education

- *June 1989*, Ph.D. Stanford University, Department of Economics.
- *June 1983*, B.A. University of California at Berkeley, Department of Economics.

Five most recent articles in refereed journals

1. *Forthcoming* (And Tom Downes), "Understanding Why Universal Service Obligations May Be Unnecessary: The Private Development of Local Internet Access Markets" *Journal of Urban Economics.*

2. *2006* (and Angelique Augereau and Marc Rysman), "Coordination versus Differentiation in a Standards War: 56K modems." *Rand Journal of Economics.*

3. *2006* (and Mike Mazzeo), "Differentiated Entry into Competitive Telephony," *Journal of Industrial Economics.*

4. *2005* (and Avi Goldfarb and Chris Forman) "How did Location Affect adoption of the Internet by Commercial Establishments? Urban density versus Global Village." *Journal of Urban Economics.* Pp. 389-420.

5. *2005* (and Avi Goldfarb and Chris Forman) "How do Industry Features Influence the Role of Location on Internet Adoption*?" Journal of the Association of Information Systems.*

Recent Books

1. *Forthcoming* (and Victor Stango, Editors), *Standards and Public Policy*, Cambridge Press.

2. *2006* (Editor), *Computing*. Edward-Elgar Press, UK.

3. *2004*, *Diamonds are Forever, Computers are Not, Economic and Strategic Management in Computing Markets,* Imperial College Press: London.

David Kirsch & Brent Goldfarb

David A. Kirsch is Assistant Professor of Management and Entrepreneurship at the Robert H. Smith School of Business at the University of Maryland, College Park. His research focuses on the intersection of problems of innovation and standardization, technological and business failure, and industry evolution. His first book, *The Electric Vehicle and the Burden of History* (Rutgers University Press, 2000), examined the history of the electric vehicle in the U.S. in the early 20th century and the implications of that history for contemporary transportation policy. Related works appeared in *Business History Review* (2002) and *Technology and Culture* (2001). Kirsch's current research looks at the recent boom and bust in internet technology companies in the 1990s. With support from the Alfred P. Sloan Foundation and in partnership with the Library of Congress, he has established the Digital Archive of the Birth of the Dot Com Era, an archive that includes collections of business plans (www.businessplansarchive.org), legal records, and personal narratives. Kirsch received a Ph.D. in History of Technology from Stanford University, an M.A. in Economics of Technological Change from the Maastricht Economic Research Institute on Innovation and Technology (MERIT) at the University of Limburg (Netherlands), and an A.B. from Harvard College in History and Science.

Brent Goldfarb is Assistant Professor of Strategy and Entrepreneurship at the Robert H. Smith School of Business at the University of Maryland, College Park. His research focuses on how the production and exchange of technology differs from more traditional economic goods, with a focus on the implications on the role of startups in the economy. He addresses questions such as, how do markets and employer policies affect incentives to discover new commercially valuable technologies and when is it best to commercialize them through new technology-based firms? Why do radical technologies appear to be the domain of startups? His work has appeared in *Research Policy*, *Industrial and Corporate Change* and *Journal of Financial Economics*. He received a Ph.D. in Economics from Stanford University under the supervision of Nathan Rosenberg and Timothy Bresnahan, an M.S. in Economics from Tel-Aviv University, and a B.A. in Economics and Computer Science from Tel-Aviv University.

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Full vitae online at www.tomandmaria.com/tom.

SELECTED ACADEMIC:

University of Wisconsin--Milwaukee, Asst. Professor**,** School of Information Studies, 2004-

Indiana University, Bloomington, Visiting Assistant Professor, Informatics School, Fall 2003

Colby College, Visiting Instructor/Visiting Researcher, STS/Admin. Sci., 2001-3

University of Pennsylvania, History and Sociology of Science, Ph.D. May 2003

Manchester University (UK), Department of Computer Science, B.Sc. & M.Eng, 1991-1995

SELECTED PEER REVIEWED PUBLICATIONS:

"Remembering the Office of the Future: Word Processing and Office Automation before the Personal Computer," forthcoming in *IEEE Annals of the History of Computing* 28:4 (October-December 2006).

“Engineering the Progressive Office: Technical Claims to Administrative Authority, 1917-1931” forthcoming in *Enterprise and Society*.

"'A Veritable Bucket of Facts:' Origins of the Data Base Management System," ACM SIGMOD Record 35:2 (June 2006).

Thomas Haigh, “Software in the 1960s as Concept, Service, and Product”, *IEEE Annals of the History of Computing 24* (January-March 2002): 5-13.

Thomas Haigh, "The Chromium Plated Tabulator: Institutionalizing an Electronic Revolution, 1954-1958", *IEEE Annals of the History of Computing 23* (October-December 2001): 75-104

Thomas Haigh, “Inventing Information Systems: The Systems Men and the Computer, 1950-1968” *Business History Review 75* (Spring 2001): 15-61.

OTHER PUBLICATIONS, HONORS & SERVICE:

Around twenty five other publications, including research articles, book reviews, obituaries, biographies, and a review essay. Around thirty published or forthcoming oral history interviews.

Seventeen competitively reviewed presentations, including four SHOT papers, three Business History Conference papers, and papers at the North American Labor History Conference and Hagley conference on the Technological Fix. Ten invited presentations and departmental seminars including Tokyo University and a public keynote address at the 2005 CHOC workshop in Amsterdam.

Awards, Grants and Fellowships include: Software History Center Research Fellowship (2003), IEEE Life Member Fellowship in Electrical History (2000-01), Tomash Fellowship in the History of Information Processing (Babbage Institute, 1999-00), William Penn Fellowship (1995-99), Fulbright Award for post-graduate study in the US (1995-96)

Biographies editor and board member of *IEEE Annals of the History of Computing*

Chair, SHOT SIG on Computers, Information and Society, 2005-