A MAJOR NEW RESEARCH AND EDUCATION INITIATIVE AT THE MIT SLOAN SCHOOL OF MANAGEMENT

PROPOSAL FOR SPONSORSHIP

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Proposal

We are inviting a select few companies to become sponsors of the Center for eBusiness@MIT at the MIT Sloan School of Management, with all the rights and privileges described herein, in support of education and research.

Rationale

A few times in a century, a new technology profoundly alters the competitive landscape and provides the seeds of radical change. It is now clear that the Internet is such a technology. To better understand the opportunities created by eBusiness, the MIT Sloan School of Management has launched a research and education initiative in partnership with industry. We will provide leadership in four key areas:

- Thought leadership on eBusiness – developing and implementing winning strategies in the Internet economy
- Real-time education at both the Masters and Executive Education levels so companies can boost the aptitude of existing managers and hire the best eBusiness-savvy MBAs in the world
- Leading edge research which is both rigorous and relevant
- Recognition as part of the team at the leading edge of Internet-focused technology, management and business strategy

The Sloan School is uniquely qualified to take a leadership role in research and education on eBusiness based upon its own focus on management and technology, and the ability to leverage other assets on the MIT campus. Key MIT resources include the World Wide Web Consortium at the Lab for Computer Science, eMarkets SIG at the Media Lab, Internet and Telecoms Convergence Consortium, and Integrated Supply Chain Management Program. This unique combination of skills, as well as the longstanding tradition of working closely with industry, makes for an extremely powerful resource in eBusiness.

Research

Both MIT and the Sloan School teach through the conduct of research. As such, the Center for eBusiness@MIT will have a heavy focus on research which is both academically rigorous and relevant to business. The Center focuses on multidisciplinary research, with an unbiased perspective, including real-time student projects (benchmarking, best practice, case-based learning), executive roundtables, workshops, Pro-seminars, conferences and a lecture series. The nature of eBusiness research almost demands an applied approach. In many cases, industry is far ahead of academia in the experimental use of the Internet and the onset of eBusiness. At the same time, little time has been spent studying and understanding the underlying principles of eBusiness, and their implications on business, the economy, our organizations, the way people work, and the potential for future success in each of these areas. The new economy is moving at Internet speed – at such a dizzying pace that little time is left for reflection. This is the undertaking of our Center’s research component. Our research efforts are objective, they are based on empirical study, they are rigorous and they are relevant to today’s business.

Below are a number of potential research questions. Others are being formulated with our corporate sponsors where there is a match between our faculty’s academic curiosity, and relevance to the sponsor’s business at hand. Appendix A provides an overview of the four research theme areas for the Center.
What sources of competitive advantage are most important in a digital economy?
What are the best strategies for moving traditional businesses to the Internet marketplace?
How will changes in transaction costs and search costs affect the optimal pricing, distribution and positioning of products and services?
How should digital information be priced and packaged?
How will the potential for improved relationship management and price discrimination change marketing?
How will the emergence of auction markets affect prices, buyers and sellers?
Will more efficient markets make outsourcing and partnering more attractive?
How will supply chain efficiencies improve, and how will procurement practices and intercompany collaboration schemes be affected?
How can and should intellectual property and personal information be protected?
What lies beyond this initial wave of Internet-based businesses, and what are the features of sustained competitive advantage in the future?

Faculty

More than 35 faculty at Sloan are already doing research relating to eBusiness and participate in the Center, with links to several research labs on campus.

Dan Ariely studies the effect of lower barriers to information found in online markets on customer price sensitivity, satisfaction and retention. In addition, Dan also studies different algorithms for smart agents, concentrating on their relative performance and adaptability.

Dimitris Bertsimas uses data mining techniques that provide tools for customer acquisition, customer classification and other utility functions.

Gabriel Bitran examines the ways that the Internet can be used to improve service management and operations.

Erik Brynjolfsson studies the economics of electronic commerce. His current projects include studies of pricing on the Internet and aggregation strategies for information goods.

David Clark's research has focused for over 20 years on the overall design rules that shape the Internet. As chair of the Internet Activities Board in the 1980's, he served as Chief Protocol Architect for the Internet. He currently chairs the Computer Science and Telecommunications Board of the National Research Council. He studies the changing requirements on the Internet in the post-PC era, and the evolving mix of regulatory and economic forces that drive today's Internet.

Michael A. Cusumano analyzes techniques for rapid and flexible strategic planning and product development for very fast-paced markets, especially Internet software and applications.

Ely Dahan studies the role of electronic commerce in new product development. Dahan also analyzes ways to use the Internet in the product design process for faster prototyping and testing of new products.

John de Figueiredo uses the empirical application of strategic frameworks to better understand the relative advantage of Internet companies in the marketplace. He also studies the impact of lobbying activity and behavior of Internet firms.
Chris Dellarocas designs the next generation of open, agent-mediated electronic marketplaces by combining concepts from artificial intelligence, economics and sociology. He is also building novel business process management tools for electronic commerce companies.

Charley Fine seeks principles for strategic supply chain design in fast-clockspeed markets and industries. He is especially interested in the mutual reinforcing process between accelerating industry clockspeeds and internet-driven business model innovations.

Sharon Eisner Gillett studies policy and business implications of evolving Internet infrastructure technology, with a particular focus on broadband access.

Stephen Graves is interested in supply chain design and planning. He develops models that can be applied to evaluate supply chain performance, to understand supply chain phenomena, and to assess the benefits of various supply chain tactics.

Benjamin Grosof studies Web/XML languages for contracts, trust, and business rules/policies, esp. in B2B/agent communication/negotiation and information integration, e.g., in marketplaces and virtual organizations.

Amar Gupta looks at a series of systems for discovery, acquisition, management and dissemination of knowledge.

John Hauser is well known for his contributions to pretest forecasting of “really new products”. Together with Eric von Hippel and Tomaso Poggio, he conducts work which includes market research using Web-based securities markets, user-design on the Web, and virtual communities as a source of lead users.

Starling Hunter researches the use of tools in mapping existing and evolving commerce models, and the impact of eBusiness on process management, change management and organizational structure.

Sandy Jap studies the impact of B2B eCommerce technologies on relationships with suppliers and customers. Her current work examines reverse auctions, disintermediation, bricks-n-clicks, and web-enabled tools for collaboration.

Richard Larson is Professor of Electrical Engineering and Director of CAES, MIT's Center for Advanced Educational Services. CAES is the hub of MIT's activities in e-Learning. His academic background is in operations research. In e-Commerce, he has been active in bringing ideas of revenue management (aka "yield management") to web-based businesses.

William Lehr studies the economics of Internet infrastructure provisioning, with a particular focus on how the changing landscape of technologies affects industry structure, business strategy, public policy and regulation.

John D.C. Little studies Internet marketing and online price setting. His current work uses online grocery prices to analyze last digit pricing strategies adopted by Internet retailers.

Andrew Lo leads the financial engineering effort at Sloan, an activity focused on mathematical and statistical tools for implementing financial models.

Stuart Madnick develops tools to facilitate the seamless flow of information in online markets. His work uses context cues in disparate online databases to facilitate the comparison of online products and product bundles.
Thomas W. Malone uses the electronic process handbook to analyze changes in corporate structure and management processes within and among companies participating in electronic markets.

Michael Scott Morton studies the strategic implications of the Internet, especially for business-to-business commerce.

Wanda Orlikowski studies how organizations make the transition from traditional to electronic modes of operating, and what factors facilitate and constrain such transitions.

James Orlin studies the area of optimization theory, with a focus on network optimization. He is interested in applying optimization methodology to data mining as well as to a variety of problems that may be referred to as automated decision making.

Georgia Perakis studies price setting mechanisms such as the design of on-line auctions from the bidders' perspective. She also studies real time pricing of products on the internet using tools from optimization, learning and multiattribute utility theory. More generally she is interested in issues relating to revenue management on the web.

Tomaso Poggio (Brain & Cognitive Science), along with Andrew Lo and Ely Dahan works on marketing research using Web-based securities markets, user-design on the Web, and virtual communities as a source of lead users.

Donald Rosenfield studies how supply chain strategies will be affected by the Internet. This work includes such issues as how national distribution systems can capitalize on the aggregated information available on the Internet, how companies can address demand for very low volume items and what kind of new distribution strategies can give competitive advantage in the B to C world.

Jeanne Ross studies the technology and organizational issues that firms face as they transform themselves from brick-and-mortar to click-and-mortar. Her particular interest has been in the development and governance of the e-business infrastructure.

Yossi Sheffi (Center for Transportation Studies) is focused on business to business eBusiness, with special attention to purchasing, selling, and supply chain management processes.

Jim Short focuses on wireless communications and market entry strategies of new firms.

Michael D. Siegel examines the implications of the Internet and eBusiness on the financial services industry with a focus on strategy, technology and application domains.

David Simchi-Levi studies the impact of the Internet on supply chain strategies. For instance, in one research project he is focusing on using dynamic and on-line pricing strategies to improve supply chain performance.

Duncan Simester works on the concept of a new variable that can be used to calibrate advertising effectiveness – product interest.

Nader Tavassoli studies the interactive processing of multimedia information and implications for marketing on the Internet.

Glen Urban focuses on trust-based marketing and personal advocates over the Internet.
Eric von Hippel together with John Hauser and Tomaso Poggio, conducts work which includes market research using Web-based securities markets, user-design on the Web, and virtual communities as a source of lead users.

Larry Wein focuses on the utility of smart market mechanisms in on-line auctions where the allocation resulting from a given set of bids is computed by solving an optimization problem.


Roy Welsch studies statistical methods and applications that relate to the analysis of data generated by electronic commerce.

JoAnne Yates studies how organizations make the transition from traditional to electronic modes of operating, and what factors facilitate and constrain such transitions.

**Education**

The pace of change brought on by the Internet is staggering. The integration of research to our curriculum must be equally fast. As such, the Center for eBusiness@MIT has a significant educational component, including a "management track" in the MBA program, student theses, and an executive education course.

- The new MBA Track in "Electronic Commerce and Marketing" is designed to help students understand how Internet-caused marketplace changes unfold, and provides them with the skills to turn them into an important source of competitive advantage. It builds on Sloan's preeminence in bridging the gap between current management problems and the technology available to solve them. The Track attempts to provide students with the intellectual and physical tools to follow the evolution of the changing market while competing effectively as part of the game.
- PhD and Masters students are doing Theses on eBusiness, Internet marketing and related topics. In many cases, such as for the M.Log., PhD and Masters in Management degrees, the opportunity to do field work at sponsor companies will be an important component of students’ education and research work.
- The executive education courses include a series of two-day, intensive studies of early research findings, course work from the track, and discussions led by industry experts. Sponsors of the Program may reserve slots for their employees at each session of the course.

**Deliverables**

Appendix B lists the basic activities of the Center for eBusiness@MIT. Below are what we believe to be the key deliverables to our corporate sponsors.

**Thought Leadership** – "On Internet time” is a way of saying that Internet businesses are moving extremely fast. Strategies are changing drastically in response to the opportunities (and threats) offered by electronic commerce. There is not a lot of time left over for deep thinking about underlying motivations of consumers, developing economic models, price sensitivity and the like. Our Center
faculty are producing thought leadership in their overlapping areas of expertise – all of which is focused on eBusiness. This thought is objective, supported by empirical study and can be used as a critical strategic advantage. When matched with the experiences of senior executives from our sponsor companies, this makes for an extremely useful discussion. We stimulate this coming together of deep thinking with real-time experiences through an Executive Board that includes participants from our faculty, Founding Sponsors and “at large” participants from other levels of participation. Founding Sponsors are also encouraged to host an Executive Briefing for the company’s Board of Directors or Executive Committee. And our Founding Sponsors are invited to speak in the Master’s Pro-seminar within the eBusiness and Marketing track. Other activities in this area include Workshops on sponsored research projects, an Annual Conference, Weekly Seminars and an invitation to attend the eBusiness Awards.

**Executive Education** – Nobody on the planet has more than 5 years of experience in eBusiness. And until 1999, no top business school has offered an eBusiness-focused degree. This makes for an “untrained” workforce. Thus we believe that in addition to the offerings of the Master’s program, continuous training of company personnel is a key benefit of participating in Sloan’s Center for eBusiness@MIT. Our executive educational programs will be run in 2-day and special 5-day courses. The first course will be in January 2000 with two other 2-day courses to be scheduled in March and June. Due to the heavy subscription of courses offered already at Sloan through the Master’s Program, we will provide complimentary and reserved seats in our executive education courses for sponsors. We will also make the Master’s Track course materials available to sponsors.

**Research** – MIT teaches by doing research…research that is both rigorous and relevant. At present there are 15 core faculty conducting research on eBusiness ranging from product design on the Web to the economics of aggregation and disaggregation to real-time pricing to auction markets to the design of universal financial applications. In addition, critical work is being done on the “higher level” analysis of Internet strategies and the methods of changing existing models to Internet-based channels. Founding Sponsors and Research Sponsors choose projects that are of particular interest to their company and that have “academic” substance. At this level of funding, MIT will provide thesis (Masters) and RA (PhD) work from our students and their faculty advisors. Other research will include Team Projects at the Master’s level, and open access to working papers in advance of publication.

**Recruiting** – As noted above in the Executive Education section, experienced and grounded eBusiness professionals are hard to find. We expect that in its first year as a Track in the Master’s program, Electronic Commerce and Marketing will be the most popular for our students. Not surprisingly, it will likely be the area of heaviest recruitment as well. The key to recruitment is getting the right corporate people in front of students and then communicating the opportunity of working with your company. Our sponsors will be invited to a “closed” recruiting event. Through the Pro-seminar, sponsored research, Team Projects and summer internships, our sponsors will have numerous opportunities to interact with the students.

**Electronic Access** – We practice what we preach. All of our working papers will be available on-line, as will the bulk of the teaching materials for the Master’s and Executive Education courses. Private sites will allow sponsors to interact with the faculty and students that are involved in their funded research.

**Recognition** – Our sponsors are leaders in their industry sectors, and MIT takes great pride in its leadership role in linking technology and management, research and teaching. On our Web site, in our promotional materials and at major events, we will duly note the sponsoring partners involved in this collaboration and acknowledge their leadership in shaping the new economy.
Funding

A small group of Founding Partners is sought. Funding is dependent on the common interests of the sponsor and the faculty, at three specific levels of collaboration (See Appendix C). Please contact Peter Metz (pmetz@mit.edu) or Debie Thomas (debiet@mit.edu) for further details.
Appendix A – Research Themes

The research program will focus on four broad themes, with projects defined in consultation with our corporate sponsors – always embracing academic rigor and real-world relevance.

Marketing. Marketing will be fundamentally changed by the Internet. Good price, advertising, distribution and product design decisions will require new data, models, strategies and organizational structures. Not surprisingly, our research in the area of marketing will touch on a number of issues related to optimal pricing, positioning, distribution, packaging, product development, auction markets, aggregation and disaggregation, and customer satisfaction. We are developing analytical models of the relationships among search costs, transaction costs, prices and profit margins; analyzing the profitability of bundling, site-licensing, subscriptions and other aggregation strategies; studying the impact and feasibility of personalized pricing, last digit pricing, real time pricing and price discrimination strategies to segments of one; understanding the utility of various types of agents; using multimedia as a means of marketing and selling product; and exploring the Internet’s utility for new product development, prototype assessment, and product testing.

Technology. The Internet presents a number of new information systems and technological challenges. While others at MIT concentrate on standards and technical development of the Internet (W3C), our center will focus on the impact and enabling factors of technology. For example, several projects are focused on the use of technologies for knowledge management and process design tools, with a cataloging of eBusiness processes. Other research focuses on software technology for autonomous agents and trusted advisors. And there is a large body of research around intelligent aggregating of information from disparate sources through context flags and cues.

Strategy, Economics and Organization. Perhaps some of the more interesting strategic analysis of eBusiness will be understanding the utility of existing economic analysis tools, and hopefully developing insight to new ways of thinking about the digital economy. Here our research will include assessments of the economic impact and feasibility of pure auction markets; understanding the pace of evolution toward Bertrand competition and offsetting factors; understanding the economics of aggregation and disaggregation; and studying the optimal design of agent-based markets and eBusiness through economic analysis, simulation and experiments. On the strategy front, our research focuses on the sources of competitive advantage in the digital economy; the best, fastest and most flexible strategies for moving traditional businesses (and delivering new products) to the Internet; and emerging themes for successful eBusiness strategies. We also look at organizational design and the people within organizations, understanding the flow and management of processes and knowledge, virtual corporations, knowledge workers, the role of geography and community, and the protection of personal information and of intellectual property. And what lies beyond this initial wave of Internet-based businesses – what are the features of sustained competitive advantage in the future?

Operations, Production and Supply Chain Management. Today, business-to-business eBusiness is twice the size of business-to-consumer eBusiness. Rapid Internet order fulfillment through flexible supply chains will represent an area of major breakthroughs. Particular areas of interest to our faculty include the impact of efficient markets on outsourcing, partnering and joint ventures; the impact of supply chain efficiencies on procurement practices and inter-company collaboration schemes; new methods of improving service management and operations; and purchasing, selling and supply chain management.
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<th>THEMATIC AREAS</th>
<th>PARTIAL LISTING OF FACULTY AND THEIR RESEARCH INTERESTS</th>
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| **Marketing** | Dan Ariely – electronic smart agents that learn, provide alternatives of maximum desirability and their impact of decision strategies  
Ely Dahan – use of eBusiness in new product development; using the Internet in the product design process for faster prototyping and testing of new products  
John Hauser and Ely Dahan – enabling users to design products on the Web using intuitive graphical user interfaces  
Richard Larson – brings ideas of revenue management (aka "yield management") to web-based businesses  
John Little – online price setting and last digit pricing strategies  
Nader Tavassoli and Duncan Simester – measuring on-line advertising effectiveness through a new variable – product interest  
Glen Urban – trusted advisory agents, online customer advocacy and “listening in” for product design development  
Eric von Hippel – examines the sources of and economics of innovation, with a particular focus on the significant role played by users in the innovation development process |
| **Technology** | Dimitris Bertsimas – data mining techniques for customer behavior, and vendor optimization for customers based on previous purchasing behavior  
David Clark – studies design rules that shape the Internet, changing requirements on the Internet in the Post-PC era, regulatory and economic forces that drive the Internet  
Chris Dellarocas – next generation agent-mediated electronic marketplaces and business process management tools for eCommerce companies  
Sharon Gillett – studies policy and business implications of evolving Internet infrastructure technology, broadband access issues  
Benjamin Grosof – Web/XML languages for contracts, trust, and business rules/policies, esp. in B2B/agent communication/negotiation and information integration, e.g., in marketplaces and virtual organizations  
Amar Gupta – systems for the discovery, acquisition, management and dissemination of knowledge  
William Lehr – studies economics of Internet infrastructure provisioning, how technologies affect industry structure, business strategy, public policy and regulation  
Stuart Madnick and Michael Siegel – implications of the Internet and eCommerce on the financial services industry including strategies for financial aggregators, using XML and developing a Universal Financial Application  
Daniel Weitzner – directs the Technology and Society Domain of the World Wide Web Consortium, focusing his interests on standards, privacy, payment systems, content filtering and intellectual property rights  
Roy Welsch – studies statistical methods and applications that relate to the analysis of data generated by electronic commerce |
| **Strategy, Economics and the Organization** | Erik Brynjolfsson – studies the economics of electronic commerce, especially pricing and the aggregation of information goods and has developed a matrix of change approach for facilitating the movement to new Internet strategies  
Michael Cusumano – analyzes techniques for rapid and flexible strategic planning and product development for very fast-paced markets, including Internet software and applications  
Ely Dahan and Andrew Lo – conducting market research utilizing Web-based securities markets  
John de Figueiredo – studies the regulatory politics and economics of telecommunications and Internet technologies. He also studies strategies of Internet companies, and the transition of incumbent firms to the Internet  
Starling Hunter – tools for mapping existing and evolving commerce models – and the impact of eBusiness on process management, change management and organizational structure |
| Thomas Malone – uses the eProcess Handbook to analyze changes in corporate structure and management processes within and among companies participating in electronic markets |
| Michael Scott Morton – studies the strategic implications of the Internet, especially business to business commerce |
| Wanda Orlikowski and JoAnne Yates – case studies on how organizations transition to electronic modes of operating – and the factors that facilitate and constrain such transitions |
| Jeanne Ross – studies the technology and organizational issues that firms face as they transform themselves from brick-and-mortar to click-and-mortar. Her particular interest has been in the development and governance of the e-business infrastructure |
| Jim Short focuses on wireless communications and market entry strategies of new firms |

**Operations, Production and Supply Chain Management**

| Gabriel Bitran – examines the ways that the Internet can be used to improve service management and operations. He is interested in the study and modeling of B2B e-commerce, as well as in service quality in the B2B environment |
| Charley Fine – seeks principles for strategic supply chain design in fast-clockspeed markets and industries. He is especially interested in the mutual reinforcing process between accelerating industry clockspeeds and internet-driven business model innovations |
| Stephen Graves – is interested in supply chain design and planning. He develops models that can be applied to evaluate supply chain performance, to understand supply chain phenomena, and to assess the benefits of various supply chain tactics |
| Sandy Jap – studies eBusiness tools for communication and coordination in channels of distribution and the supply chain with a focus on strategic partnerships and alliances |
| James Orlin – studies the area of optimization theory, with a focus on network optimization. He is interested in applying optimization methodology to data mining as well as to a variety of problems that may be referred to as automated decision making |
| Georgia Perakis – studies price setting mechanisms such as the design of on-line auctions from the bidders' perspective. She also studies real time pricing of products on the internet using tools from optimization, learning and multiattribute utility theory. More generally she is interested in issues relating to revenue management on the web |
| Donald Rosenfield - studies how supply chain strategies will be affected by the Internet. This work includes such issues as how national distribution systems can capitalize on the aggregated information available on the Internet, how companies can address demand for very low volume items and what kind of new distribution strategies can give competitive advantage in the B to C world |
| Yossi Sheffi – focuses on business to business eBusiness with special attention to purchasing, selling and supply chain management processes |
| David Simchi-Levi - studies the impact of the Internet on supply chain strategies. For instance, in one research project he is focusing on using dynamic and on-line pricing strategies to improve supply chain performance |
| Lawrence Wein – performs research at the intersection of supply chain management and e-commerce, including developing algorithms for "smart market" B2B on-line procurement auctions, dynamic learning by auctioneers in repeated on-line auctions, competition among auctioneers in on-line B2B and B2C auctions, and optimal production control and speculation for a manufacturing facility operating in an electronic marketplace |
A. Marketing

A1. “Listening In” for New Product Ideas

_Glen Urban (glurban@mit.edu)_

Previous research at MIT has developed a new approach to Internet Marketing based on a virtual advisor communicating with a consumer in a trusting environment to determine the right product for them to buy. This project extends the past research to include a virtual engineer who can listen in to the dialog between the advisor and customer to identify unmet needs. These unmet needs are identified when the customer states a desire and no product can be selected to increase the utility of the best alternative as the result of that new input. For example in 1995 the desire for a large luxury sports utility van would be identified if no truck was found that increased the utility of the best truck for this person after the size and luxury inputs. Using rule-based programming, utility analysis, and statistics, need profiles can be identified and probed to find opportunities for really new products. A design pallet is provided to consumers so they can design in open format the product they want.

A2. Consumer Advocacy

_Glen Urban (glurban@mit.edu)_

The Internet has the potential to radically alter the power balance between consumers and manufacturers/retailers. This project explores the design of a site to provide maximum power for the consumer. The advocate site would include capabilities for: trusted advice, security services to assure privacy on the Internet, complaint resolution, concierge services (repetitive and crisis help), bidding agents across the Web, community interaction and development (individual interactions, political advocacy). The project is to design and test such a site and measure its acceptance and impact on marketing practices.

A3. The Virtual Customer

_Ely Dahan (edahan@mit.edu)  
John Hauser (jhauser@mit.edu)_

In order to gather improved consumer preference information at the early "fuzzy front end" of new product development, we will enable respondents to design products on the Web using intuitive graphical user interfaces such as drag & drop, click-on components, and computerized questionnaires. We will also employ 3-D visualization methods to clarify product functionality, ease-of-use, and aesthetics for the respondents. User-designs will serve as inputs into more refined market research methods such as conjoint analysis and discrete choice as a method of improving the accuracy of the utility functions derived by those methods. The notion of user design for the purpose of on-line configuration, market research and sales of actual products will also be explored.

A4. Electronic Smart Agents

_Dan Ariely (ariely@mit.edu)_

There is no question that relying on a personal advisor who can help people makers make decisions with the least amount of effort is a highly desirable state of affairs. Currently, these professional advisors are limited to a few specific and specialized domains and to a small group of people. However, with the development of electronic media and eBusiness, a new type of personal advisor can and is becoming feasible - an electronic smart agent. Smart agents are a metaphor for a good and dedicated advisor whose goal is to help individuals make good decisions without burdening them with having to search and comprehend everything about the domain and the alternatives. On many grounds, Smart agents are considered to be one of the main potentials for the future of electronic commerce. The goal of the current proposal is to explore and understand the characteristics of different types of smart agents. Part A is
aimed at understanding how different types of smart agents learn and improve over time. Part B is aimed at understanding how smart agents can present decision-makers with alternatives in a way that would maximize the desirability of the selection (the set of alternatives), while at the same time facilitating efficient learning on the part of the agent. Finally, part C will examine how decision strategies will change when they are based on advice from electronic smart agents.

A5. Measuring Advertising Effectiveness on the Internet Through Product Interest

Duncan Simester (simester@mit.edu)
Nader Tavassoli (nader@mit.edu)

Valuations of Internet companies are, in part, based on advertising revenue models and advertisers are looking for ways to evaluate the effectiveness of this new medium. In a current working paper ("The Effect of Advertising Repetition on Product Interest," Simester and Tavassoli, 1999) we offer a new variable that can be used to calibrate advertising effectiveness: product interest. We measure interest through reader reply card responses and find that response to repeated advertising exposures differs significantly from the pattern of response to traditional measures of advertising effectiveness (i.e., memory, attitudes, and purchases). Moreover, we find that the slopes of the response curves differ based on advertisement characteristics. Building on our findings, we suggest that click-through rates for banner ads are best conceived as interest for more information. We propose to examine the effects of advertising repetition as a function of advertisement characteristics, of advertisement pulsing patterns, and of competitive advertising. Our research aims to shed light on the dynamics of Internet advertising, and to provide a model by which advertisers can design and evaluate, as well as predict the future success of their campaigns. We seek funding for a full-time research assistant/programmer and expenses related to (1) obtaining and analyzing click-stream data, and (2) testing our model in a Web-based experiment.

A6. Toolkits for User Innovation

Eric von Hippel (evhippel@mit.edu)

Today, purchasers of many types of mass-customized products have only a very limited freedom to develop the customized product they really want. Typically, they are restricted to making selections from a list of options offered by a manufacturer. I am currently conducting research into "Toolkits for User Innovation" that can greatly expand users' ability to design exactly what they want on the Web. Toolkits consist of "user-friendly" design software that enables users to carry out complete cycles of trial-and-error learning on their own, using their customary design language and skills. During the design process, the toolkit software is constantly checking that a users' evolving design stays within the bounds of the producible. Completed designs are automatically translated into the format needed by the intended production process.

B. Technology

B1. eBusiness and Financial Services

Michael Siegel (msiegel@mit.edu)
Stuart Madnick (smadnick@mit.edu)

They seek to examine the implications of the Internet and eBusiness on the Financial Services Industry. Our goal is to understand the strategy, incorporate evolving technologies, demonstrate new applications, and create the vision for the globalization of financial services. This effort builds upon previous research on information extraction and integration for financial applications, such as global risk management and financial data providers. Though they have developed significant technologies in these areas (http://context.mit.edu/~coin/), this set of projects focuses on a combination of strategy, technology and application for financial services eBusiness. Examples of current projects include:

- Strategies for Financial Aggregators
- The Business Model for Universal Financial Applications
- The Business Model for On-line Bill Payment
The Use of Data Standards in Global Risk Operations
Data Quality and Context Differences in Financial Information
Using XML and Web Wrapping for Extraction and Integration of Information from Multiple Financial Sites
Developing Context Representations and Mediators for XML
Business-to-Business eBusiness for Capital Markets
Aggregators as Universal Applications in Financial Services
Case Studies of Financial Information Integration for Global Risk Operations

B2. Knowledge Systems

Amar Gupta (agupta@mit.edu)

Knowledge Acquisition Systems which focus on gathering information from diverse sources and media. In particular, many organizations have to deal with huge amounts of information that resides on paper media. For example, 66 billion checks are processed each year in the US alone, at an estimated cost of $1.20 per check. The current recurring annual cost of $88 billion can be drastically reduced electronic techniques. The US Patent Department has awarded a broad patent for key parts of the new technology developed by the team, and efforts are underway to apply the technology in the US and abroad. Knowledge Discovery Systems which focus on analyzing huge amounts of historical and current information using emerging data-mining techniques, such as those incorporating neural network techniques. These techniques have been utilized to optimize supply chain and inventory levels in a multi-organizational environment, and also for analyzing online commercial data. Knowledge Management Systems which focus on getting information from multiple sources, both current and legacy, and facilitating the flow of information across organizational boundaries while still preserving the full rights and competitive ability of each collaborating organization. The creation of an integrated Command and Control system for the US Department of Defense is one example of research in this area. Knowledge Dissemination Systems which focus on the use of Internet and Internet2 Paradigms to carry information to the user. This aspect includes the extraction of relevant knowledge from huge systems, tailored to the needs of individual user.

B3. Fast and Flexible Techniques for Software Development

Michael Cusumano (cusumano@mit.edu)

This research project is surveying state-of-the-practice development techniques used at firms that are competing in various software markets, including Internet and e-commerce infrastructure software. This is a continuation of research I have done at Microsoft and Netscape, most recently discussed in the book Competing on Internet Time: Lessons from Netscape and Its Battle with Microsoft (1998). The objective of the present study is to understand which techniques are best to promote speed (time to market) and flexibility (ability to evolve designs) while still maintaining reasonable levels of quality and cost. The research covers techniques for generating product requirements as well as managing the development, testing, and release processes. The first setting for the study is a sample of approximately 30 projects at Hewlett-Packard. We then intend to extend the sample to other software producers in the United States, Europe, and Japan. Also participating in this project are faculty members at the Harvard Business School (Alan MacCormick) and the University of Pittsburgh (Chris Kemerer).

B4. Data Mining in eBusiness

Dimitris Bertsimas (dbertsim@mit.edu)

This project proposes the use of optimization methods in classifying customers according to previous purchases. We have developed new algorithms for classifying customer behavior using discrete optimization methods. Our method also proposes alternatives that customers are likely to purchase. Preliminary comparisons show that these methods perform favorably with more traditional heuristic methods.
B5. Vendor optimization in eBusiness  

Dimitris Bertsimas (dbertsim@mit.edu)  

Typical customers have a multi-attribute utility when purchasing a particular product or selecting a vendor that is typically not well articulated. We propose to use previous choices to construct a utility function within a parametric family that is consistent with previous purchases, and then search the Internet in order to find and to propose choices to customers that maximize this utility. Our approach uses optimization methods a) to construct this utility and b) to select the best choices.

B6. Mechanisms for Producing Trust and Managing Operations Risks in Online Trading Communities  

Chris Dellarocas (dell@mit.edu)  

Several properties of online interaction are challenging the accumulated wisdom of trading communities on how to produce trust and manage transaction risks. Dellarocas researches the design, implementation and effects of novel mechanisms for achieving these all-important objectives in online marketplaces. His recent work has focused on building reliable online reputation systems as well as on the design of automated exception handling infrastructures for virtual supply chains.

B7. eBusiness Process Handbook  

Thomas W. Malone (malone@mit.edu)  
John Quimby (quimby@mit.edu)  

The eBusiness Process Handbook is an on-line repository of many kinds of knowledge about eBusiness, including innovative business models, processes, and technologies. We expect it to provide an integrated vehicle for sharing case examples, concepts, and other research results from the different projects in the Center for eBusiness @ MIT and from other sources. By relating and recombining these different ideas, we also expect this tool to help generate new ideas for further innovations. The work draws upon over eight years of prior research at the MIT Center for Coordination Science in developing a knowledge base of over 5000 business processes and activities and sophisticated software tools for storing and viewing this knowledge. Specific foci available for sponsorship within this project include: (a) collecting innovative case examples of eBusiness best practices and implementation approaches, (b) linking the process knowledge base to organizational change tools like the Matrix of Change, and (c) linking the process knowledge base to tools for supply chain visualization and simulation.

B8. Statistical Methods and Applications  

Roy Welsch (rwelsch@mit.edu)  

Statistical methods include data-mining and refining, sequential sampling, trees and networks for time-stamped data, dynamic updating, and validation. Applications include mass customization, loyalty analysis, setting advertising rates, network reliability, and fraud detection.

B9. Contracts and Policies for eCommerce  

Benjamin Grosof (bgrosof@mit.edu)  

The design and management of how automated enterprises and intelligent agents will soon communicate at a high level of shared understanding ("semantics") with each other over the Web in e-commerce (esp. B2B). The focus is especially how business rules and policies are specified, communicated, and implemented in that context. Two important technical aspects of this are XML and techniques for knowledge representation and inferencing. Topics include: contracts, trust and authorization, offering/bid descriptions, catalogs, negotiation and auctions; "agent markup languages", i.e., XML for agent communication; virtual organizations and outsourcing; composing marketplaces and intermediary agents; marketplace-to-marketplace (M2M) communication; automated learning by "talking" as well as from data mining; conflict handling and merging of business rules/policies; and intelligent integration of information from multiple sites. I've just joined MIT Sloan after 12 years at IBM Research where I led projects on Business Rules for eCommerce and Intelligent Agents for Internet.
B10. e-Learning
Richard Larson (rclarson@mit.edu)
Undertaking research and creating business plans for products and services in e-Learning including corporate training. Understanding what works and what doesn't work in web-based distance learning environments, to enhance the learning experience and to reduce dropout rates. Using Bayesian methods to learn what web learners know and are likely to do.

B11. Revenue Management
Richard Larson (rclarson@mit.edu)
Applying ideas of revenue management to internet businesses. Revenue management was born in the airline industry in the 1980's and now is widely accepted framing method for improving profitability of services companies with perishable product (such as bandwidth or web "real estate").

B12. Mass Customization Applied to the Web
Richard Larson (rclarson@mit.edu)
Personalized web pages for various products and services and owned devices can create a tight bonding experience between user and service provider. This project is a bit "out of the box" as it explores personal web pages for one's own motor vehicle and other large capital assets. Personal web pages also for one's major accounts and vendor relationships.

B13. Internet & Telecom Commitment (ITC)
David D. Clark (ddc@lcs.mit.edu)
Sharon Eisner Gillett (sharoneg@mit.edu)
We seek to shed light on the forces that shape the future of the Internet infrastructure, both public and private, that ebusiness depends on. The viability of many future product opportunities depends on the co-evolution of Internet business models, regulation and technology. For Internet TV to become widespread, for example, service providers must develop working revenue models; policy makers must adapt existing regulations, such as those for intellectual property rights and availability of particular types of content, to the Internet medium; and application developers must be able to build on infrastructure technologies that are still evolving today, from broadband access networks to advanced compression technologies, consumer devices and networks in the home.
ITC is structured as a multi-disciplinary academic and cross-industry consortium. Our research integrates the perspectives of engineers, economists, political scientists and industry specialists to discern the future of the Internet. Inevitably, the emergence of new services on the Internet sideswipes established industries. We seek to identify the opportunities that emerge from such collisions. Particular areas of focus include:
- Internet Appliances: architectures for integration of user devices beyond the PC, including home-based and mobile devices
- Broadband Access: economics and technology of delivering high-speed, always-on Internet access to the mass consumer market
- Economics of the Cloud: strategic and technical issues raised by the Internet's structure as a network of networks, such as the challenge of delivering end-to-end Quality of Service.
Examples of current projects include a taxonomy of Internet appliances and studies of mobile Internet radio, wireless networks for the home, the cost of optical backbone networks, and financing models for fiber to the home.

B14. ASPs
Richard Larson (rclarson@mit.edu)
Application Service Providers (ASPs) are growing market share in e-Business. This research seeks to identify disruptive technology ASPs that allow products and services from such hosted applications that
were not feasible before the Internet and the implementation of the ASP model. Newly emerging ASP aggregators represent an example of a potentially disruptive technology. Another is the emerging class of WASPs (Wireless ASPs).

C. Strategy, Economics and the Organization

C1. How Does the Internet Affect Search, Competition and Pricing?

_Erik Brynjolfsson (erikb@mit.edu)_

Synthesize current research on the effect of Internet marketing and distribution on the pricing of goods and services. Develop analytical models of the relationships among search costs, transaction costs, prices and profit margins. Assess these models using data from actual markets, comparing Internet-based retailers with traditional retailers. Conduct market tests and experiments in cooperation with sponsor companies and determine how to apply the general findings to specific industries and cases.

C2. Pricing of Information: The power of bundling, site licenses and subscriptions

_Erik Brynjolfsson (erikb@mit.edu)_

Research the economics of aggregation and disaggregation, especially as applied to digital information goods whose marginal reproduction costs are nearly zero (news, software, music, stock quotes, data feeds, archival text, research reports, chat room, product information, video games, etc.). Analyze the profitability of bundling, site-licensing, subscriptions and other aggregation strategies. Develop models of optimal bundle size and composition. Assess the strategic and competitive implications of aggregation-based the nature of economies of scale and scope. Assess where and how disaggregation and unbundling can increase profits.

C3. Organizational Transformation using the Matrix of Change

_Erik Brynjolfsson (erikb@mit.edu)_

Successful businesses, whether or not they use the Internet, can be thought of as bundles of interacting processes, practices and principles. The transition from a traditional business model to one that fully leverages the Internet typically requires a cascading set of organizational and strategic changes. The Matrix of Change is a tool which has been developed to codify and analyze the nature of these changes to help managers understand whether the transition to a Web-based business can be incremental or radical and whether it will effectively leverage existing business processes or require a fresh start. This project will refine the Matrix of Change tool via application to specific business transformations and develop a repository of successful (and unsuccessful!) transition strategies.


_Wanda Orlikowski (wanda@mit.edu)_

_JoAnne Yates (jyates@mit.edu)_

We are interested in studying how organizations make the transition from traditional to electronic modes of operating, and what factors facilitate and constrain such transitions. We propose to do this research by conducting a number of detailed case studies of firms currently engaged in transitions to eBusiness, and learning from their experiences. This research will focus on questions such as the following:

- How do organizational structures and processes change in order to support electronic modes of operating?
- How does the speed and timing of business processes change in order to support electronic modes of operating?
- How do communication patterns -- both within the firm and with external parties (suppliers, customers, alliance partners, etc.) -- change in order to support electronic modes of operating?
- What are the social and technological factors that facilitate and constrain transitions to electronic modes of operating?
To conduct this research, we intend to hire Master's students as Research Assistants. While each RA will be responsible for studying a specific firm engaged in a transition to eBusiness, we will coordinate the case studies to allow for comparisons across the firms.

C5. Securities Trading of Concepts (STOC)
Ely Dahan (edahan@mit.edu)
Andrew Lo (alo@mit.edu)
Tomaso Poggio (tp@ai.mit.edu)
As an Alternative to more traditional market research methods in which respondents are asked directly about their preferences for products, we hope to take advantage of the pricing mechanism in efficient markets by allowing groups of respondents to trade "product securities" amongst themselves in a simulated financial market and let the price-quantity pairs of their trades indicate their preferences. Using double regression methods, this information should provide accurate market share and price sensitivity predictions. We will compare these results with those from traditional methods.

C6. The Use Of Tools In Mapping Existing And Evolving Commerce Models, And The Impact Of Electronic Commerce On Process Management, Change Management And Organizational Structure
Starling Hunter (starling@mit.edu)
In general, my research interests concern the organizational consequences of the information technologies which are commonly associated with electronic commerce and virtual organization - EDI, Internet & Web-based applications, data warehousing/ data mining, groupware, and portable and client-server computing, etc. In particular, I am interested in assessing the impact of these information technologies on the physical separation of work, workers, and work facilities from the main or headquarters locations. The is very little quantitative empirical work, as of yet, on whether and how IT will lead to more (less) "bricks and mortar", more (fewer) workers located at remote locations, or which kinds of work will be performed or decisions made at a distance. I am interested in developing analytical models of the impact of IT on organization design and decision-making which (1) account for and distinguish among the extent of use, the total quantity or capacity, and the objective properties of information technologies while (2) systematically controlling for and/or testing for interactions with other determinants of organization design, e.g. size, environmental uncertainty, organizational culture, etc.

C7. Platform Leadership and Complementary Innovation
Michael Cusumano (cusumano@mit.edu)
This project, done with Professor Annabelle Gawer of INSEAD (a former MIT Sloan PhD student), is studying how firms can create technology-based “platforms” that serve not only as the basis of their primary businesses but also as foundations around which other firms can create complementary products and services. We are interested in how firms think strategically about platforms as a business as well as how they can best orchestrate innovation across industries, which involves creating interfaces to their platforms, managing the information related to the interfaces, and subsidizing or coordinating the work of other firms creating potentially complementary innovations. A fundamental idea is that these technology-based platforms have little value without complementary innovations and acquire more value the more innovations there are available. A key example we have looked at is Intel, which has viewed the microprocessor as a platform for other firms to build a multitude of complementary hardware and software products, recently including Internet telephony applications, multimedia tools, and Internet server technologies. We are also interested in studying other areas where we see competition existing or emerging around platform leadership and complementary innovations, such as: e-business software technology platforms (Oracle, Microsoft, Sun/JavaSoft); Internet infrastructure solution platforms (Cisco, Lucent, Nortel); web-enabled cell phone platforms (Qualcomm, Nokia, Motorola, Ericsson, NTT); PDA and other sub-PC device software platforms (Palm, Microsoft/Windows CE, Psion); e-content and e-services platforms (AOL versus a multitude of competitors); non-PC home game device platforms (Sony, Sega, Nintendo
C8. Nonmarket Strategy and Regulation of the Internet

*John de Figueiredo (jdefig@MIT.EDU)*

The Internet is often seen as the last bastion of unregulated commerce, where buyers and sellers consummate transactions free from the heavy hand of government. However, as the Internet and World Wide Web develop, this will become less true. In the past twelve months, there have been over 100 bills introduced into the U.S. Congress to outlaw or regulate certain practices on the Internet. At least three administrative agencies have claimed regulatory oversight responsibility over aspects of Internet access and commerce. There are also a number of international bodies that are attempting to control the development of the trade on the Web. Despite this strong trend toward regulation, only a handful (by last count) of e-business companies have a Washington office, and less than forty have Washington representation. This research project has two main parts. The first part is to examine a number of Internet regulatory initiatives, and understand how they will affect Internet commerce. Some firms will be advantaged, while others will find themselves at a significant disadvantage if many of these regulatory initiatives are carried through. The second part of the research project is to examine what should be the lobbying and litigation strategies for firms, in order to insure that the inevitable regulation that does arise does not negatively impact their business. Issues that will be covered by the project include data and consumer privacy, equal access, and liability.

C9. Will They Really Outlaw Aggregation? Getting and Blocking Internet Legislation

*John de Figueiredo (jdefig@MIT.EDU)*

Shopbots, aggregators, and price comparison engines have all found significant favor by consumers using the Web. Yet, there are two proposals in Congress to prevent data piracy and stop these intermediaries from unauthorized aggregation of information from web sites. There are two sides to this issue. Opponents of the legislation argue that these kinds of laws are unnecessary because copyright law protects data sufficiently, and the courts can adjudicate disputes that occur. In addition, they argue that aggregators serve to decrease consumer search costs, and thus increase consumer welfare. Proponents of the legislation argue that if aggregators are allowed to persist, the web sites that are being aggregated will no longer have an incentive to invest in assets and relationships, because the value generated from these investments will be usurped by the aggregators. This research project examines this debate in depth, and assesses the economics and politics of the debate. It evaluates the incentive structures and consumer welfare properties of data aggregation. It then investigates the nonmarket strategies firms have employed to seek and block legislation.

C10. Managing the e-Business Infrastructure

*Jeanne Ross (jross@mit.edu)*

Regardless of their strategic objectives in pursuing e-business, firms are finding that the transformation from brick-and-mortar to click-and-mortar requires them to learn new ways of organizing and managing their operations, and new ways of applying and investing in information technology. In a study of companies’ transformation efforts, we found they could apply three strategic levers to accelerate their learning and leverage their experience: IT infrastructure investment practices, e-business governance processes, and IT product and service delivery. Through a set of case studies, we will extend this study to explore alternative business models, the information technology and processes infrastructure needed to support them, and the metrics that help firms articulate and achieve their e-business objectives.

D. Operations, Production and Supply Chain Management

D1. Online Optimization-Based Auctions: New Horizons for Industrial Trade

*Lawrence M. Wein (lwein@mit.edu)*

Traditional open auction mechanisms seem poorly adapted to the relatively sophisticated trade of industrial goods, which often involves capacity constraints, transportation costs, complex quality
requirements, and where transfer price is thus only one consideration among others when it comes to
determining an allocation. One-on-one negotiation and sealed-bid selection mechanisms are thus typically
preferred to live auctions in industrial environments, even though they are often considerably more time-
consuming and less competitive. To address these flaws, some researchers have recently suggested
"smart" market mechanisms, where the allocation resulting from a given set of bids is computed by
solving an optimization problem. As an example, consider an industrial buyer seeking to procure several
component types requiring common and limited production resources (stamp press, mold injector) from
competing suppliers: the optimal procurement allocation, which minimizes procurement cost (determined
using the suppliers' bids) subject to those capacity constraints, solves a linear program. This research
project concerns the online and dynamic implementation of such mechanisms through a distributed
computer network. We believe the main obstacle to competition in this environment, namely the bidders'
rationality limitations due to allocation complexity, can be resolved by providing them with sensitivity
analysis information relative to their bids (e.g. shadow prices from a linear program). Our goals include
designing a behavioral bidding model in such a setting, characterizing the likely outcomes of these
computer-assisted auctions, and benchmarking through auction experiments involving human subjects
various information feedback structures (i.e. what the competitors know when they bid).

D2. e-Procurement: The Impact of Reverse Auctions on Supply Relationships
Sandy D. Jap (sandyj@mit.edu)
In many industrial markets, buying organizations are turning to the use of reverse auctions to gain
procurement efficiencies. In this research, I am trying to understand how the use of reverse auction
processes impacts the firm's relationship with its suppliers. This research identifies the tradeoffs between
short-term savings and supplier intangibles (e.g., opportunism suspicions, satisfaction, etc.), and considers
whether the relational impact varies systematically across bid type (i.e., open and sealed) and supplier
type (i.e., new and incumbents). This project is also sponsored by Visteon Automotive, Leaders for
Manufacturing, and the MIT-Ford Alliance. If you would like to view the video series on this work, go to
http://nMinds.com for a free viewing.

D3. e-Collaboration: Creating Win-Win Solutions in Electronic Spaces
Sandy D. Jap (sandyj@mit.edu)
An ongoing challenge in many cross-functional teams is to get the members to look for win-win solutions
to joint problems on a regular basis. What types of processes facilitate this orientation and can we build
the necessary characteristics into an electronic medium such as collaborative groupware? In this research,
I am trying to discover a systematic process for how cross-functional teams can develop mutually
beneficial solutions in electronic contexts on a regular basis. This project is sponsored by the MIT
Integrated Supply Chain Management Program and is actively recruiting organizations to participate
beginning July 1, 2000. Any organization that participates in this project will receive a web-enabled,
multi-hour problem-solving session in which strategic and tactical issues of various teams will be
thoroughly addressed and possible solutions identified.

D4. Managing Bricks-N-Clicks
Sandy D. Jap (sandyj@mit.edu)
How will the internet change the firm’s value chain with suppliers and distributors? Will it increase the
number of organizational members or disintermediate them? Will it open new markets or create channel
conflicts? I have developed a systematic tool for evaluating the impact of the internet on supply chains
and distribution structures. This tool enables the firm to explicitly consider the B2B functions that will be
enhanced or impeded by the internet and allows a framework for strategic decision-making. It highlights
opportunities for channel efficiencies and areas at risk for channel conflict.

D5. Strategic Supply Chain Design
Charles Fine (charley@mit.edu)
This project seeks to identify principles to guide strategic supply chain design by understanding the drivers of change in supply chain structures and the role of supply chain capabilities in achieving competitive advantage. Some industries have supply chains organized around a few, large, vertically-integrated firms (e.g., autos, aircraft, media), others have supply chains with a more "horizontal-modular" character, with a multitude of players combining their talents to provide value to end customers (e.g., bicycles, consumer electronics, book publishing). As internet commerce has driven the acceleration of industry clockspeeds, the swings between vertical and horizontal structures have accelerated. As a result, the "optimal" supply chain design strategy is shorter-lived in the eBusiness age than in times past. This project will examine, both theoretically and empirically, the drivers of such changes in supply chain structures, including those related to IT-enabled changes in supply chain relationships, to help guide strategic supply chain design. The research will build on the concepts developed in Professor Fine's recent book, "Clockspeed: Winning Industry Control in the Age of Temporary Advantage" (http://www.clockspeed.com).

D6. Optimal Production Control and Speculation for a Manufacturing Facility Operating in an Electronic Marketplace
Larry Wein (lwein@mit.edu)
We are studying a manufacturing facility that produces a commodity item, such as steel, paper, plastics, etc. in an electronic marketplace. This facility has some customers that are tied into long-term contracts at fixed prices. In addition to this stable customer base, there are dynamic arrivals of electronic customer orders (characterized by price and deadline) and electronic offers (completed goods of subcontractors/competitors, which are also characterized by price and deadline). The problem is to dynamically decide which electronic orders and offers to accept, and also decide on a production policy (i.e., how much safety stock to hold to satisfy for orders). This is essentially a combination optimal production control/speculation problem where there are two sources of supply (in-house production and the electronic offers) and two sources of demand (the traditional customer base and electronic orders). The traditional customers and the facility's own capacity have fixed prices, whereas the prices of the electronic orders and offers vary over time (e.g., according to a geometric Brownian motion), and hence invite speculation. We also determine an optimal mix of electronic and traditional business.

D7. Competing Online Auctions
Larry Wein (lwein@mit.edu)
We are studying a B2B setting where two competing facilities manufacture the same commodity (e.g., integrated circuits) and periodically (e.g., weekly) hold internet auctions to sell their goods. We analyze whether these facilities are better off offering synchronized auctions (e.g., both are on Fridays at noon) or independent auctions (e.g., one facility holds auctions on Tuesday mornings, the other on Friday afternoons). In the synchronized case, we assume that a certain fraction of bidders are simultaneously logged into both auctions. In the independent case, we assume that customers may (after incurring a delay cost) participate in Friday's auction if they are not successful in Tuesday's auction. This analysis also holds for B2C settings, where two competing electronic auction houses sell the same types of items.

D8. Study and Modeling of B2B e-Business
Gabriel Bitran (gbitran@mit.edu)
Research focuses on understanding, acquiring and retaining customers; identifying and pricing value propositions; defining a proper platform for services and products; and designing the interface. The latter includes which communication and distribution channels to use, the capacity of each channel, and the design of incentives to encourage customers to use the appropriate channels.

D9. The Design of Auctions for Bidders
Georgia Perakis - joint with Dimitris Bertsimas (georgiap@mit.edu)
In this research we study the design and control of auctions on the internet. We design bidding strategies from a B2C point of view. We consider users participating simultaneously in a number of auctions, all of them not necessarily starting or ending at the same time. We use optimization and optimal control tools.

D10. Dynamic Pricing of Products on the Web

*Georgia Perakis - joint with Dimitris Bertsimas (georgiap@mit.edu)*

In this research we study dynamic and real-time pricing of items on the web. We do not consider the demand for the items as given but consider it as a parametric family of the factors that influence it such as for example of price. We learn the demand as we keep learning more information on the customers and our competitors over time. We use techniques from optimization learning and multiattribute utility theory.
Appendix B - Overall Program Outputs

**Working Papers:** A primary output of the research program is a series of working papers by MIT faculty and students.

**Conference:** An annual conference supports research and dialogue on topics relating to eBusiness. Workshops and Presentations: Research is also disseminated via numerous (more focused) workshops at MIT.

**Seminar Series:** The Center sponsors a weekly research seminar at MIT which is open to sponsors, students and researchers.

**Website:** A Web site with public and private areas provides easy access to working papers by MIT faculty, links to significant research on eBusiness around the world, a calendar of events, educational materials and other information useful to Center participants.

**Discussion Forums:** A multi-disciplinary team from MIT will lead periodic discussion forums with participants in the Center. This will take the place of research meetings and on-line discussion forums.

**Student Projects:** Individual students and teams of students work closely with member companies to apply the research findings from the Center to specific situations and to analyze potential applications of eBusiness.

**Education:**

*Master’s Level:* The Sloan School has launched a new MBA "track" on Electronic Commerce and Marketing. There is strong student interest in the Track, which is expected to enroll more than 60 MBA students. The Track includes several new courses, a weekly Pro-seminar, and project work with sponsoring companies. In some cases, these links lead to the hiring MIT students for summer or permanent jobs.

*Executive Education:* The highest bandwidth for technology transfer is people. We are developing a series of two-day executive education courses, with longer special courses to follow. The course materials will be based specifically on developments and findings of the Center.

**Recruitment:**

A sponsor’s-only event will be organized in the February of each year so that sponsors have the opportunity to meet the students, and vice versa.
## Appendix C – Methods of Participation

<table>
<thead>
<tr>
<th>KEY BENEFIT</th>
<th>FOUNDING SPONSOR</th>
<th>RESEARCH SPONSOR</th>
<th>MEMBER</th>
</tr>
</thead>
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| Thought Leadership | ✐ Seat on Executive Board  
че Executive Briefing  
че Participation in Pro-Seminar  
че Invitation to Research Workshops  
че Invitation to Annual Conference  
че Invitation to eBusiness Awards  
че Invitation to Seminars | ✐ Invitation to Research Workshops  
че Invitation to Annual Conference  
че Invitation to eBusiness Awards  
че Invitation to Weekly Seminars | ✐ Invitation to Annual Conference  
че Invitation to eBusiness Awards  
че Invitation to Seminars |
| Executive Education | ✐ Complimentary Slots in ExecEd Course  
че Reserved Slots in ExecEd Course  
че Open Access to MBA Course Materials | ✐ Complimentary Slot in ExecEd Course  
че Reserved Slots in ExecEd Course  
че Open Access to MBA Course Materials | ✐ Reserved Slots in ExecEd Course  
че Open Access to MBA Course Materials |
| Research          | ✐ Sponsorship of Research Project(s) with Masters or PhD Research Assistantships  
че MBA Team Projects  
че Access to Working Papers | ✐ Sponsorship of Research Project with Masters or PhD Research Assistant  
че MBA Team Projects  
че Access to Working Papers | ✐ MBA Team Projects  
че Access to Working Papers |
| Recruiting        | ✐ Participation in Recruiting Event | ✐ Participation in Recruiting Event | ✐ Participation in Recruiting Event |
| Electronic Access | ✐ Private Web Site | ✐ Private Web Site | ✐ Private Web Site |
| Recognition       | ✐ Recognition on Website, Materials and Major Events | ✐ Recognition on Website, Materials and Major Events | ✐ Recognition on Website, Materials and Major Events |
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