



E-Commerce and the Changing Terms of Competition: A View from within the Sectors

*A Workshop Presented by
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Summary Proceedings

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Session I

The purpose of this opening session was to flesh out various policy issues and perspectives on what kind of regulation the changing marketplace needs in order to sustain stability, growth, and innovation. Panelists argued for and against self-regulation as a policy-making model. Views ranged from the opinion that the private sector is setting adequate policy standards and necessarily challenging the traditional policy development process, to the warning that private-sector led policy standards will be inconsistent, short-sighted, and eventually stifle innovation. Panelists described how different legal theories (such as misappropriation theory, tort, trespass, and contract) apply to the e-commerce marketplace and its emerging policy issues. Agreeing that regulation must touch areas of intellectual property, taxation, and privacy standards and protection, the panelists discussed whether this regulation is better driven by private or public actors. One key conclusion was that the public-private regulation debate is misplaced, while the important question is how the law develops a marketplace, not whether it should or not. A number of speakers also touched on the issues of civic culture, the digital divide, and quality of information, reminding us the policy should serve the interests of the public good as much as economic interests in growth and prosperity.

Chair: Mr. Michael Kleeman

Opening Remarks: Mr. Brian Kahin, Visiting Scholar, BRIE; Fellow, Internet Policy Institute
Prof. Mark Lemley, Professor, Boalt Hall School of Law, UC Berkeley; a Director of the Berkeley Center for Law and Technology
Prof. Pamela Samuelson, Professor, School of Information Management & Systems and Boalt School of Law, UC Berkeley; Co-Director of the Berkeley Center for Law & Technology

Commentators: Dr. Thanassis Chrissafis, European Commission
Ms. Tara Lemmey, CEO, Projectlens
Dr. Robert Litan, Vice President & Director of Economic Studies, Brookings Institution; Cabot Family Chair in Economics
Prof. Peter Lyman, Professor and Associate Dean, School of Information Management and Systems, UC Berkeley
Prof. Robert Post, Alexander F. and May T. Morrison Professor of Law, School of Law (Boalt Hall), UC Berkeley

Mr. Brian Kahin, Visiting Scholar, BRIE; Fellow, Internet Policy Institute

The principal reference for e-commerce policy is the current Administration's Framework for Global Electronic Commerce, which articulates policy across a wide range of domains. The Framework includes a set of five principles, but these are principles of posture rather than substance. One principle notes that insofar as electronic commerce is global, policy development must be coordinated internationally. Another emphasizes that the Internet is different enough to require rethinking traditional models of law and regulation. The remaining three are corollaries: The private sector should lead, the public sector should be slow to act, and that where intervention is necessary, it should be predictable, minimal, consistent and simple. Only the last even suggests substantive policy.

Behind the Framework and many other expressions of e-commerce policy is a vision of "enhanced markets." The idea is that the Internet makes markets to be bigger, more open and transparent, faster, more responsive, and rapidly evolving. Along with liberalization, deregulation, and globalization, the Internet helps commerce transcend borders. Internet standards provide a platform for an outpouring of competition and innovation. The Internet enables collaboration and transactions across departmental and organizational boundaries. Outsourcing and new forms of organization flourish. Consumers reign supreme. Transaction costs plummet.

Since the Framework does invite rethinking, these phenomena of the "enhanced markets" reasonably leads to a reweighing of factors, equities, tradeoffs, and balances behind different policy regimes. For example, the Global Internet Project argues that global electronic commerce gives consumers so much choice among that vendors ought to be able to contractually bind consumers to the law of any jurisdiction rather than that of the consumers' residence.

In effect, the private sphere is greatly enlarged by fast-changing technology, new business models, unbound markets, proliferating choice, and the advent of software agents to manage choice. The government's ability to monitor change, let alone develop policies in a reasoned, open, and democratic manner – with no new resources – is severely constrained. Indeed, many things remain limited or fixed relative to changes in the marketplace: human

attention, statistical data for new aspects of the economy, semantic limitations of the English language, political processes, residual transaction costs, legal structures and procedures.... The political economy of e-commerce is shaped by the tension between enhanced markets, which should be enjoyed and exploited for what they're worth, and these institutions and processes that, for various reasons, resist change.

Prof. Mark Lemley, Professor, Boalt Hall School of Law, UC Berkeley; a Director of the Berkeley Center for Law and Technology

The Internet has created markets on a scale and with a level of efficiency not previously possible. Firms such as E-bay and Amazon are examples of these large-scale and highly efficient markets. Nevertheless, there is a dark cloud on the horizon that threatens to undermine the efficiency gains of the Internet-enabled marketplace, restrain consumer choice, and stifle future innovation. This dark cloud comes in the form of court cases launched primarily by large Internet firms with a stake in protecting dominant competitive positions in the market. What these cases portend is an Internet environment with legal roadblocks to efficiency and innovation that parallel markets in the physical world. There are dangers in leaving policy to private actors and the courts; contrary to Kahin's model of self-regulation (as predictable and consistent), e-governance by these means would be un-uniform, short-sighted, and legally unstable.

There are eight different scenarios in which these impediments are emerging.

- (1) The theory of "trespass" deriving from notions of property rights. This theory has been applied by certain e-commerce sites (notably E-bay), to restrict access of competitors and data aggregators to the information on those sites. E-bay's aim is to establish the viability of the concept of trespass on an Internet site.
- (2) There are now intellectual property suits against search engines and suits against web linkers. These cases are still pending.
- (3) Misappropriation theory refers to taking something valuable under circumstances that you shouldn't have, for example creating deep links (into the interior of a site) or framing two sites side by side. This category is problematic because it is amorphous.
- (4) There is an increasing tendency for companies to write contracts for their website users that are extremely onerous in their restrictions upon the way in which a user can use the site.
- (5) There are increasing numbers of websites using technological protection systems to restrict access.
- (6) Digital copyright law makes it a crime to enter a website where the web owner has tried to restrict intruders.
- (7) There is an increasing and alarming tendency for companies to seek patents not only on technologies but also on business models. Priceline (reverse auction) and Amazon (one-click shopping) have insisted that business models should be subject to patent and copyright protection. It is conceivable that protective business method patents would stifle innovation in the Internet space.
- (8) Database protection laws to restrict access to database information to competitors.

Two years from now, far from minimizing transactions costs, Internet commerce may be so stifled by an uncertain or highly restrictive legal environment that it will lose momentum as a source of innovation and growth in the economy. Lemley warned against leaving crucial regulatory battles entirely up to courts and the private sector.

Prof. Pamela Samuelson, Professor, School of Information Management & Systems and Boalt School of Law, UC Berkeley; Co-Director of the Berkeley Center for Law & Technology

Governance is more than what governments do. In the case of e-commerce, the governance agenda has been left largely in the hands of industry, but the private sector is an unstable environment, focused on code production and technology rather than policy. Private actors pay little attention to the long-term, policy implications of their coding. Industry goals differ from policy goals. The private sector is ill-equipped to manage the policy problems they are facing.

The government has delegated much authority over e-commerce to new private/non-governmental organizations. These groups (i.e. ICANN, W3C, ISDMI) are increasingly edging over into policy issues. What follows are three examples of codes becoming a governance structure.

1. The W3C has been promoting a privacy standard called P3P. P3P goes outside the bounds of the W3C goal of creating technical standards. P3P defines privacy protection capabilities. This is a policy standard determined by a private group.
2. ICANN recently imposed a dispute settlement mechanism upon all registrars and registered parties that mandates all of those on the web to resolve naming conflicts. An NGO's forcing a dispute settlement mechanism upon firms is definitely a policy action. What business does a private body have imposing international rules?

3. SDMI is the Secure Digital Music Initiative, which aims to achieve consensus among sound recording companies and equipment manufacturers to set standards for making secure music available on secure players (instead of unsecure MP3 files on unsecure computers). Again, this is a case of a private group setting standards which would function as policy.

People are not yet fully aware that technical standards and architecture (set/defined by W3C, IETF) are indeed policy. This private-sector-driven method of policy-making provides no mechanism for accountability. Often these self-governance mechanisms take on the character of collusion. In fact, the government has been concerned that the new Ford, GM, Daimler-Chrysler supply-chain marketplace would be put to anti-competitive ends. The companies were so focused on achieving efficiencies and making it work that they didn't anticipate antitrust scrutiny. This kind of collaboration has the potential to attract federal collusion charges.

This case demonstrates the short-term perspective of business decision-makers. They never thought this cooperation could violate anti-trust law. The recent decision on the Microsoft case demonstrates a certain amount of boldness on the part of the government. This new attitude might trigger increased government's involvement in governance issues. These two facts together point to a central policy problem: the anti-trust paradigm has been both reinvigorated by the digital economy and it is also undermined by the new forms of cooperative/collaborative organization that it generates.

Additionally, improving self-regulation methods requires that companies learn to trust each other. Firms are often in a "prisoner's dilemma" situation: They fear others' cheating and therefore do not cooperate. An essential element to creating the basis for self-regulation is finding a common goal (i.e. interoperability). The role for government and policy is to create regulations which resolve this dilemma of mistrust.

It is important to start thinking about what governance models exist and which are applicable to e-commerce. If the private sector does not begin to address the policy problems that others (consumers, policymakers, other businesses) consider important, the private sector will, by default, invite the government to take back the regulatory agenda. The opportunity for the private sector to define policies which will enable profits and competition is now.

Dr. Thanassis Chrissafis, European Commission

Europe faces unique factors affecting the e-commerce regulation debate. If the EU is to push e-commerce and expand its membership to eastern European countries, this is essentially forcing rapid adaptation onto economies unprepared for full digitization. The other option is a disjointed union whose economic parts cannot communicate on equal footing. Secondly, Europeans are traditionally more demanding about trusting third parties. This hesitation initially inhibits the ability of firms and banks to conduct business or make contracts and purchases electronically. Especially in the area of B2C commerce, this might be a problem. Despite all the excitement over e-commerce, B2C commerce is still only about twenty percent of e-commerce.

Business models affect the nature of the marketplace; for example the organizational structure of a firm affects the character of its outsourcing. Before attempting to resolve the numerous legal problems, one must ask what kind of "vision" one has for e-commerce, because that is necessary for developing effective regulation. How will people engage this new reality? This "vision" could include increasing the number and penetration of networks, as well as determining how to stimulate the growth of their content and how to encourage individuals to be entrepreneurs in this more open system. The answers to these questions will shape policy.

Ms. Tara Lemmey, CEO, Projectlens

Ms. Lemmey advocated a policy approach focusing on "first principles", targeting the roots of changes and problems, rather than their effects. These principles must be formed as a foundation for Internet Governance, and they must address certain questions: who are the interested parties, are processes transparent, are solutions easy to implement and do they allow for global flexibility?

Additionally, one must consider whether the given policy issue is indigenous to the Internet or indigenous to an information society before designing a solution. Essentially, this is a question of whether the policy issue is technological or social. Each requires a different policy approach. For example, does the economy (or a given area of the economy) operate on the basis of social contracts, or is the setting a 'contract society'? In other words, what is the contract tradition: verbal and informal contracts of understanding or detailed, legal, written agreements? The answer to this will determine how explicit agreements about use of data gathered on the Internet must be, and thus also how explicit regulatory policies must also be in order to protect privacy.

Another question which would help guide policy approaches is the relationship between stability of a firm and its ability to reach the scale of the Internet. Which factor, stability or scale, must be protected or fostered via policy in order for a firm to achieve both? We usually assume that stability is a result of a firm's ability to reach economies of

scale, or peak efficiency. But is putting scale before stability the right policy approach in this economic setting? These questions must be explored thoroughly, to their roots and ‘first principles’ and by multiple actors with different perspectives and goals, if e-regulation is to be effective.

Dr. Robert Litan, Vice President & Director of Economic Studies, Brookings Institution; Cabot Family Chair in Economics

Dr. Litan characterized three general approaches toward Internet regulation. The first, which he called West Coast or libertarian, trusts that the market and technology will eventually solve all problems, while the government cannot. Proponents of this self-regulation approach believe that private sector actors best understand the Internet and thus are best equipped to structure and regulate its relationships. The second, pessimistic, approach, as articulated by Lawrence Lessig in his book *Code*, believes that code-writers are already fixing the problems and consequently de facto writing laws. This self-regulation is, according to this pessimistic viewpoint, dangerous because it leaves too much power in the hands of private actors who do not, in fact, have public interests in mind. Code-writers must be subject to democratic control by strong government regulation. But this is likely to fail because of political incapacity and technological difficulties in exerting regulatory control. Strong government regulation would also pose a choice of evils. The third approach, which Litan termed cyber-realist, holds a neutral view of both government and markets. Litan proposed that the government is capable of controlling “elephants but not the mice.” This new economy is too varied and expansive for controlling all private actors to be feasible, and thus the government should focus on regulating those large firms which are more visible and have more power to set industry precedents. Litan argued that only large, established firms (elephants) worry greatly about protecting their sites; the new small start-ups (mice) want the exposure and thus are willing to withstand less regulation. Given this dynamic, policy should focus on the elephants and forget the mice also because it is much easier to regulate the elephants than the mice.

Proprietary control over information is becoming doubly problematic. First, intellectual property rights have steadily expanded to the point where they include business models and practices that may describe entire markets. These new standards impose high barriers to market entry for new players and threaten to stifle competition and innovation. In an even more dramatic development, e-commerce and other Internet-related firms are seeking to create technological means of preventing open access, copying, and thus the fair use of information. In these new technological environments, proprietary control over information is essentially protected forever. Intellectual property policy traditionally served the purpose of balancing economic incentives for continued creative innovation against the goal of dissemination of information to the public. This policy balance, along with intellectual property itself, may be threatened with obsolescence by the new technology-driven restrictions on the dissemination and reproduction of information. Both these technological restrictions and the expansion of intellectual property rights began as a response to initial concerns about the threat to intellectual property posed by the Internet. Now they themselves may threaten innovation and vibrant economic and cultural development.

With so much purchasing occurring on-line, sales tax revenues are dropping in many communities, opening the question of how to replace this revenue. Litan referred to Hal Varian’s work, which predicts so many problems with and resistance to harmonizing sales taxes nationally that governments will instead adjust income taxes to compensate, noting that this would produce a less regressive tax structure. This seems implausible to many now, but once X% of revenue is lost from local sales to the web this solution might start to gain some merit. This is not just a question of policy; it demonstrates how e-commerce is fundamentally restructuring the economy, state and polity.

Prof. Peter Lyman, Professor and Associate Dean, School of Information Systems Management (SIMS), UC Berkeley

Before government there is governance; before governance there is polity; before polity there is civic culture. Referring back to the word ‘polity’ in title of this session, Prof Lyman discussed how e-commerce impacts civic culture. Especially in less developed countries, there is substantial resistance to e-commerce because of its perceived damage to social and civic bonds. Lyman suggested applying Max Weber’s *The Protestant Ethic and the Spirit of Capitalism* and his notions of routinization to the debates on how policy should shape e-commerce. If Weber were to write today, would he call it “The Protestant Ethic and the Spirit of E-Commerce”? One could see the routinization of everyday life and civic culture as a result of e-commerce’s penetration into the marketplace and social spheres, as Weber saw in capitalism.

According to statistics, in 1998 the Internet was used mostly for educational purposes, job-seeking, work, and family communication—e-commerce usage represented a very small percentage. The worrisome “digital divide” is not about access to information but rather about quality of information. How does that information change our daily lives and affect the quality of our relationships? Does it improve the quality of information, or merely the supply? These

social questions demand policy driven by the interests of the society at large rather than by the interests of industry actors.

Prof. Robert Post, Alexander F. and May T. Morrison Professor of Law, School of Law (Boalt Hall), UC Berkeley

“There is no market without property, and no property without law, and not law without the state.” Thus the libertarian position collapses. There is no such thing as market without government—the market exists as a sub-strand of rights, which were created in order to support some norms and values and diminish others. The question is how the law intervenes to develop the market, and Post disagreed with Kahin’s vision for an unregulated Internet. Such a “Hayekian vision of legal transparency” was incomprehensible because markets do not exist without law and government. As yet, there exist no preconditions for simple legal interventions in e-commerce, due to the lack of social norms in this area. Post specifically attacked the libertarian view as undemocratic because it deprived the body politic of the opportunity to deliberate over and choose public/social values embodied in law and thus inscribed in economic structures.

For example, trespass is based on the notion of ownership and its embedded values include privacy and a Lockean vision of labor. Do those values apply in e-commerce? More broadly, why should Lockean liberalism be the assumed privileged normative/ideological position and the basis of law, regulation, and economic life? Which values should be furthered? How are the desired values to be encouraged (through control, incentives, or some other method)? How to create legal instruments flexible, far-sighted, and effective enough to intervene in the rapidly changing environment of e-commerce? Post offered no answers to his questions, emphasizing his intention to demonstrate that e-governance is not simply a question of “law or not law” but a complex legal, social and political debate.

Open Discussion

This discussion focused on two primary topics: privacy and self-regulation. **Prof. John Zysman** opened the discussion with privacy: Traditionally, privacy regulation has focused on protecting citizens from the state’s potential misuse of personal information. But now private organizations have even more information about people than the state does. What mechanisms exist, or should exist, to protect individuals against private misuse of information?

Ms. Lemmey responded that we have to clarify our concept of identity on the Internet before technical solutions are feasible. This is different than hiding from an advertiser who might aggressively solicit your business, but becomes a real question of protecting (hiding or defending) one’s ‘self’. **Prof. Samuelson** asked whether information is a commodity interest or a civil liberty interest. The EU directive frames personal information as a fundamental civil liberty. In the US, no consensus exists around personal data as a civil liberty. The US government has tried to get businesses to internalize privacy through self-regulation. This prod, prod, prod strategy is the government’s way of creating an infrastructure so that when regulation comes, the private sector is prepared.

Prof. Post outlined three models of privacy protection. 1. Tort – Speech acts are regulated, not data, in order to prevent or punish offense. Use of information is regulated, rather than the information itself. 2. Government regulation – Weberian rationality is applied to information. For example, the potential for misuse of data causes public unrest, forcing the legislature to pass a law requiring data accuracy by credit card companies. 3. As with the EU directive, privacy is viewed as a human right to autonomy. This gives information some of the qualities of a property right. The EU directive is in tension with itself, but points to an entirely different basis for regulation that is emerging in another political and social context. **Prof. Lemley** added that civil liberties are oriented towards the state; the market is supposed to deal with private actors. The market approach assumes that individuals do not value privacy. Current tort law does not give much leverage against data privacy violations, and nothing prevents courts from creating new laws that apply to private actors. **Dr. Litan**, noting that consumers show an overwhelming concern about privacy issues, asked why financial institutions don’t adopt a model of self-promotion as “the bank with the best privacy policy”. This would be an example of the private sector addressing public policy concerns via self-regulation, but why hasn’t this advertising scheme caught on? Is this a sign that the private sector is indeed unequipped for self-regulation, or is it just too soon?

Articulating an industry viewpoint, **Dr. Robert Glushko** said that the distinction between the concerns of companies and the concerns of individuals or consumers is somewhat simplistic, since many of the new business models and technologies of Internet commerce make it possible to view transactions involving people and transactions involving computer systems in exactly the same way. Commerce One is attempting to dismantle the distinction between person and machine. Do transactions with machines require a different level of protection than transactions between people? Certain privacy standards, or understandings, exist in the spheres of traditional person-to-person commerce, established through time and practice. How do such standards need to be altered to meet the needs of e-

commerce? What, substantively is the real difference between a person-to-person transaction and a person-to-machine (or even machine-to-machine) transaction conducted in the new economy? Once the distinction is broken down, Mr. Glushko asked, how should privacy be regulated and protected? On the subject of self-regulation, **Mr. Henry Lichstein** said that standards follow practice; as the economy moves from the terrestrial to the virtual, policy standards will develop themselves. **Mr. Peter Harter** took a more critical view of self-regulation. The new business model has not developed its style of shaping policy. Silicon Valley CEOs are too young, “too startup”, to consider the importance of policy; they simply don’t have the experience to foresee and explore the policy issues. **Ms. Lemmey** agreed with **Prof. Samuelson**’s view that companies who do self-regulate are stifled by those who do not self-regulate. Self-regulation can hurt them in the marketplace because it threatens their competitive advantage

Session II

Textiles & Retail Sector

This session was opened by Prof. Hammond’s giving a detailed presentation of the B2B and B2C opportunities for electronic commerce in the apparel industry. The structure of the industry lends itself to certain opportunities and limits itself in other areas. The question emerged whether and which parts of the industry can be restructured to accommodate and take advantage of digital communication. The discussants generally agreed that e-commerce opportunities for the apparel industry are largely B2B, streamlining the supply chain by improving communication between retailers and manufacturers. The character of apparel shopping does not lend itself to digitization of B2C commerce, due to the personalized nature of choosing and purchasing clothing. On an organizational level, brick and mortar stores have a hard time adapting their current structures (i.e., inventory management) to Internet sales, while pure plays suffer from high rates of purchase-returns, difficulties branding their name, and, as with brick and mortar stores, order fulfillment presents a real challenge to organization. However, the industry is taking certain opportunities, for instance in digitizing information about customers (size, colors, preferences) and establishing “brick and click” companies that can take advantage of on-line sales while covering losses on returns with in-store sales.

Chair: Prof. Stephen Cohen

- “E-Commerce in the Textile and Apparel Industries”

Prof. Jan Hammond, UPS Foundation Professor of Business Logistics at Harvard Business School

Commentators: Ms. Annaflavia Bianchi, Head of research, Future Centre of Telecom Italia, Italy
Mr. Niko Waesche, Vice President of GRP Global Retail Partners; PhD Candidate, London School of Economics

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- “E-Commerce in the Textile and Apparel Industries”

Prof. Jan Hammond, UPS Foundation Professor of Business Logistics at Harvard Business School

Prof. Hammond made three broad observations about current trends in on-line apparel sales: (1) apparel items have distinctive features that make them more difficult to sell via Internet than other goods like books or compact disks; (2) B2C models have taken a variety of forms, yet all have had difficulty with order fulfillment and customers’ tendency to return clothing bought on-line; (3) B2B models appear able to capture benefits from smart organization of the textile-apparel-retail supply chain.

Distinctive features of clothing which have become apparent with on-line retailing are:

- Specifics of the product are difficult to describe on-line (fit, color, feel)
- Reviews by experts or other customers are not very useful to potential consumers
- Returns (purchasing & returning clothing to the merchant) are thus much higher in clothing than in other on-line sectors.
- The ratio of off-line shopping (as a result of on-line window/comparison shopping) to on-line shopping is much higher in clothing than in computer software, music, and books. Customers tend to use the web for clothing ideas, not for actual decisions and purchases.

B2C companies have attempted to address these challenges with special color-true software, or with personalized sizing advice based on measurements the consumer enters.

Competition in the textiles and apparel industry occurs on cost and quality, but also on “fashion” – characterized by short trends in consumer taste and hence product lifecycles. Over the past decade this led the brick and mortar apparel industry to a “lean retailing” strategy – ordering stock week by week to reduce the risks associated with holding inventory. Lean retailing thus led sophisticated distribution centers to replace warehouses, and put a premium on retailers’ ability to manage supply channels and inventories. On-line sales face the same pressures only at a much greater intensity: IT systems must be able to deliver small quantities of clothing quickly and efficiently.

So far, catalogue companies have had the easiest time making the transition to on-line retailing. Brick and mortar retailers and manufacturers are having a more difficult time, in part because re-tooling order fulfillment processes to individual purchases is tremendously difficult – for example, the system must be able to handle large, wooden shipping palettes of jeans, for example, but also single-item orders. Pure plays have experienced similar problems with order fulfillment; their largest challenge, however, has been branding so that they gain consumer confidence. Hammond was skeptical about trends toward mass customization – the practice of making clothes to order for a huge audience. She pointed out that the requirements are more difficult than those faced by Dell, which builds computers “made to order”. Dell is able simply to assemble different already-manufactured modules; in clothing, each component has to be separately cut to size and sewn.

In contrast, Hammond was more optimistic about the B2B models and opportunities. The supply chain in global textiles and apparel is highly fragmented and includes many small local players. By increasing the transparency of the supply chain, gains from lean-retailing may be pushed even further. B2B models include (1) associations of manufacturers, (2) independent marketplaces for excess intermediate and final goods, and (3) major sourcing companies. Examples of current B2B associations of retailers include the Worldwide Retail Exchange, an international association with 16 major retailers and \$400 billion in sales. The expected benefits include:

- Decreased costs of communication in supply channel,
- Improved visibility along the supply channel,
- Improved forecasting capabilities,
- Reduced inventories in the supply channel.

Sears, for example, expects purchase order costs to decrease from \$100/order (current cost using EDI system) to \$10/order (using a Web-based retail exchange). However, because apparel plants are often small and unsophisticated and because communicating about product design and plant capabilities is hard to specify for textiles and apparel, B2B strategies are unlikely to “disintermediate the intermediaries.” Players with good knowledge of local actors and their capabilities will be hard to replace with automation and IT.

In conclusion, there is much greater potential for e-commerce to penetrate B2B than B2C apparel sales, because the supply chain can capture the streamlining benefits of on-line communication and transactions. Customer sales are still restricted on-line by taste, tangibility, and fashion cycles, which do not lend well to effective choices and efficient distribution.

Ms. Annaflavia Bianchi, Head of research, Future Centre of Telecom Italia, Italy

The textile and apparel industries are quite different. Textiles, with its three main phases – fiber, yarn and fabric – have become a global market with commodification of the product, a consolidated trading activity increasingly dealt with by on-line marketplaces and exchanges (Global Textile Network, VerticalNet, and others) in which Italy is currently playing a limited role.

The Italian apparel industry is characterised by strong outsourcing of various production phases, traditionally fulfilled by satellite companies located in the region, but increasingly involving plants or subcontractors abroad. As a result of this internationalization, it requires a few years to get subcontractors to respond to quality requirements. The industry is showing a trend towards vertical integration especially downward towards the distribution network, through franchising or single-brand shops. Different from the USA, apparel retail in Italy is not dominated by large department stores, which cover only 15% of the market.

The apparel industry is shifting from a push approach – dominated by producer and distribution retailers – to a pull approach, where the customer decides what to purchase and influences the production plan. This shift imposes a stronger coordination along the filière/channel, still dominated by leading companies. In this context, on-line applications supporting the supply chain management (SCM) represent a critical tool.

Besides the other benefits of B2B models mentioned above by Hammond, e-commerce could bring about decreased communication costs along the value-chain between manufacturers and subcontractors - reducing the time of fine-tuning with subcontractors and increasing the visibility of production flows on the supplier/subcontractor side, and with retailers and the market, grasping information from sales and customers behavior.

Bianchi agreed with Hammond’s position on B2C e-commerce. As for on-line sales, portals rather than marketplaces (used mainly for overstock) will be more adequate in an industry in which the value stays in complex

processes rather than in codified goods. Italian manufacturers face a critical decision whether to sell their merchandise on a one-brand webpage or on a website along with other brands. Benetton, a large Italian apparel manufacturer, has invested in both solutions in order to capture the benefits of each strategy while covering for the fallbacks of each (the Swedish on-line megastore Boo.com recently failed, and a Benetton brand portal is under construction).

For high-end manufacturers like the Italian Ermenegildo Zegna, e-commerce has led to innovation of their customer information system. As its product is customised and communicates functionality rather than brand, Zegna collects 200 points of a customer's body. Other companies use and reinforce their brand name by building customer communities on the web. Their product is more standard and with a shorter life.

Bianchi raised another interesting unanswered question, whether e-commerce will lead to a transformation of the locally fragmented structure of clothing companies which prevails in Italy, or whether there will be room for on-line shared SCM applications developed at the local level supporting local production systems. This also supports the assertion that e-commerce is not just a technological leap, but represents a fundamental change in the character of the economy and thus the social institutions interconnected with the economy.

Mr. Niko Waesche, Vice President of GRP Global Retail Partners; PhD Candidate, London School of Economics

Mr. Waesche mentioned two B2C challenges which apparel companies face. First, the high cost to the retailer of returned goods reduces the profitability of on-line sales dramatically. Second, "brick and click" companies have an advantage over pure play Internet companies in the apparel industry, because they can sell via their physical stores if the customer is unsure and wants to see the product before purchasing it. The B2B apparel market has great potential.

Waesche analyzed three main determinants of the future of the B2B apparel market and its players. First, the criteria for success will be to maintain sufficient liquidity in inventory and at the same time to generate sufficient transactions. Second, support services provided by B2B service companies like catalogues, financing help, etc., will be critical for players in the apparel industry. Those services have in the past been provided by brokers, who with their know-how on the demand and supply side formed an important part of the value chain. Third, the main challenge will be on how B2B cooperation between firms and those brokers will be designed. By giving brokers exclusivity or lower margins, B2B-service firms would put themselves into an unfavorable position, which leaves only the alternative of buying brokers and acquiring their know-how. The acquisition of knowledge and its translation into value-added for customers, however, is a task firms have not yet completely figured out how to achieve.

Open Discussion

Despite the problems with B2C that were presented, e-commerce offers certain opportunities to retailers. Electronically keeping track of customer sizes, preferences etc., makes it possible to track regional trends (e.g. in different states of the USA) and thus target products to markets. **Ms. Tara Lemmey** noted that sales of basic apparel items have greater potential to expand on the Internet, as customers have already pre-chosen what they want because they are familiar with the product; in this area of shopping, returns will be relatively low and consumer confidence relatively high.

A last glitch to on-line sales returns raises a legal issue: If a good is bought tax-free on-line, then returned in a brick and mortar store in a city with x% sales tax, how does this complicate taxation? This question again makes it clear that not all policy issues can be left to private actors, that foresight and legal know-how are crucial ingredients to e-commerce regulation.

Session III Auto Sector

This session began with two presentations on the automobile sector which were followed by extensive comments on the extent to which the sector can and should adapt to e-commerce opportunities. First, MacDuffie presented four areas in which digital networks can assist the industry: implementing "built-to-order" production and modular design; increasing the information available to consumers and thus improving their bargaining power; a trading platform for components to facilitate and lower costs along the supply chain; and "B2V" services, meaning installing 'information intensive' hardware and software inside cars. Second, Zettlemeyer reviewed his three hypotheses why consumers who purchase cars after using online referral services pay, on average, lower prices: dealers price more discriminately for informed buyers; dealers compete for referral services' favor; better informed consumer exercise greater bargaining power. This provides an interesting case of the Internet's general effect on commerce. Ruigrok reviewed the European experience with the Internet in the auto industry. Europeans are not limited by disintermediation laws, thus there are

opportunities for on-line car sales in Europe. Beyond B2B online trading platforms for parts, many start-ups are emerging which offer auto services and products to consumers. Key for automakers is to retain control of their end-to-end (E2E) networks, not giving in to pressures to save costs by outsourcing the supply chain via online parts procurement exchanges. The final speaker, Boyer, described how questions of organization supercede technology when analyzing the impact of e-commerce on any given sector. For autos, modularization, for example, will only be possible if firms make technological breakthroughs in the very conception of the car and change their organizational structures. Additionally, Boyer reminded the audience that e-commerce offers opportunities beyond cost efficiency—namely in improving quality and the innovation process. The final outcome will depend upon the various profit strategies followed by the firms and the national and international context.

Chair: Prof. John Zysman

- “E-volving the Auto Industry: E-Commerce Effects on Consumer and Supplier Relationships”
Prof. John Paul MacDuffie, Associate Professor in the Management Department at the Wharton School, University of Pennsylvania
Prof. Susan Helper, Associate Professor of Economics, Case Western Reserve University
- “Price Discrimination, Competition, or Superior Information? Car Pricing from Internet Referral Services”
Prof. Florian Zettlemeyer, Assistant Professor of Marketing, Haas School of Business, UC Berkeley

Commentators: Dr. Robert Boyer, CEPREMAP, France; Director, European Auto Project
Prof. Winfried Ruigrok, Professor of International Management; Academic Director of the Master of International Management Programme, University of St. Gallen (HSG), Switzerland

- **“E-volving the Auto Industry: E-Commerce Effects on Consumer and Supplier Relationships”**
Prof. John Paul MacDuffie, Wharton School, University of Pennsylvania (presenter)

Prof. MacDuffie presented two scenarios of how “e-effects” could impact the auto industry. The first scenario is a long-term vision that sees e-commerce facilitate the move to “built-to-order” (BTO) production. This scenario would have dramatic implications for the structure of the industry, pricing models, etc. The second, less ambitious scenario explores the potential impact of e-commerce if the move to BTO does not take place.

The model for BTO in the auto industry is of course the Dell Direct model of PC manufacturing. In 1999, Toyota shocked the industry by announcing the production of its Solara model as a “Five-Day-Car.” Toyota’s subsequent inability to deliver on its pledge to build a car within five days of having received the order demonstrated that the challenge of building a car to order is much greater than building a comparatively far less complex product such as a PC.

Given the high degree of product complexity, the use of e-commerce technologies to enhance demand and supply chain management alone is likely to be insufficient for a move to BTO. The key to complexity management and thus in all likelihood the second prerequisite for BTO in the auto industry is modularization, i.e. product design on the basis of modules (a “module” is defined as a set of components that are physically proximate, in other words a physical chunk that contains elements of several systems). Modular design promises to enable outsourced production of large chunks rather than just of small pieces. While it is not clear whether modularization would lead to substantial savings, the concept is attractive to manufacturers because part of the risk and development costs of the final product can be outsourced. Suppliers find the idea attractive because their share of the value-added increases. In addition, suppliers could seek to offer the same module to several manufacturers. Combined with e-commerce procurement and demand management techniques, modular design could enable BTO and radically transform the auto industry. MacDuffie stressed, however, that modularization and outsourcing must not necessarily go together and that there is considerable variance among automakers with respect to the two. In any event, BTO’s power results from effectively connecting B2C and B2B e-commerce strategies to an E2E (end-to-end) e-commerce solution,

Despite its potential advantages, the move to modular design is far from certain. One of the main technical obstacles is the lack of standards or a standard-setting process for modules. Furthermore, if modules were sufficiently standardized, widespread use of standardized modules could undermine branding efforts and distinct product images.

Given the uncertainty surrounding modularization, MacDuffie offers a second scenario that considers the potential impact of e-commerce in the absence of a move to modularization and BTO. In this scenario, the Internet will still reshape markets, provide new tools and offer new opportunities for business development. E-commerce could have an

impact in three distinct areas: Business-to-consumer links (B2C) affecting automotive retailing; business-to-business links (B2B) affecting procurement; and a new arena for competition: business-to-vehicle (B2V) products and services.

With respect to B2C, the Internet dramatically increases the amount of information available to consumers and enables the integration of different kinds of information, such as product specifications, new and used car prices, safety test results and consumer-based quality rankings. But despite these new consumer tools, there is still a dealer at the end of each purchase transaction because US law prohibits direct sale of vehicles by manufacturers to end-users. However, the Internet may transform auto dealers into model show rooms à la Gateway Store where products are examined and then ordered online.

In the area of B2B, the extent of activities within the industry is enormous. In 1999, both Ford and General Motors announced plans to put virtually all of their global purchasing activity into huge separate web-mediated exchanges. Less than four months later, these e-arch-rivals announced that they would merge their separate exchanges into one and would invite DaimlerChrysler and other manufacturers to join. The result is a yet-to-be-named trading platform for components that Goldman Sachs believes could lower production costs by up to 5 percent (MacDuffie's own, more conservative estimate suggests savings of up to 3 percent). Who will benefit the most from this single platform? At first it seemed that manufacturers would be the winners (especially the original Big Three) as they can charge subscription fees and squeeze suppliers through auctions and generally increased competition. Given the interest of even second and third tier suppliers in the exchange, however, first tier suppliers could also become winners by using the exchange to squeeze their own suppliers in turn.

Even without BTO, electronic procurement through the online exchange is likely to result in significant savings over conventional procurement systems. In terms of supplier relations, the Internet could reinforce either the "exit" or the "voice" model, or both: "exit" (abandoning a supplier relationship) becomes easier as competition increases and auctions become widely accepted, and "voice" (collaboration between manufacturer and supplier) becomes easier because communication is facilitated.

Lastly, B2V envisions "information intensive vehicles." Automakers have invested considerably in alliances with a wide array of IT hardware and software specialists because information intensive vehicles and B2V promises entirely new sources of revenue in the area of services. However, the question of standards becomes key as proprietary systems by individual manufacturers are in all likelihood too costly. One scenario envisions a "plug-and-play"-solution in which manufacturers provide docking points with standardized interfaces and customers choose the IT components they wish to connect. This model of course fits nicely into the broader ideas of modularization and BTO. But even without BTO the move to information intensive vehicles is likely.

In summary, MacDuffie suggests that e-effects will give consumers more choice and even a role as co-designer in the case of BTO, and certainly more information and hence more bargaining power vis-à-vis manufacturers and dealers even without BTO. With BTO, dealers could acquire new roles as gateways for customization and after-sale service and support providers. Without it they will have to adapt to intensified competition between manufacturers and better-informed customers. In the case of suppliers, those with strong brand names such as Bosch are likely to benefit from BTO whereas others might suffer from increased commodity competition. Without BTO and industry-wide standards, suppliers are likely to be weakened vis-à-vis manufacturers. There are, however, limits to the "exit"-option in the industry. Lastly, individual automakers could reap competitive advantages by adopting BTO early. Outsourcing risk and reducing production complexity are additional advantages of BTO to automakers that could try to focus on core design and development tasks. However, the risk of sacrificing brand identity and technological obstacles might prevent BTO. In the meantime, automakers are likely to be the big beneficiaries of a single electronic exchange and other e-commerce procurement systems.

In conclusion, the impact of the Internet on the auto industry is by no means technologically determined. To maximize the benefits offered by e-commerce, firms need to design their online strategies with consideration for their overall strategies, their competitors' strategies and investments, and the character of the markets in which they compete. The extent of "e-effects" on the auto industry will depend on the extent to which complementary changes occur in retail strategy (BTO, factory direct sales, dealer direct sales), design strategy (modular versus not, standardization versus not), organization of production (significant outsourcing or not), procurement strategy ("voice" versus "exit"), automaker technology strategy (continuous versus radical technical change), and government anti-pollution strategy (regulatory regime).

- **"Price Discrimination, Competition, or Superior Information? Car Pricing from Internet Referral Services"**

Prof. Florian Zettelmeyer, Assistant Professor of Marketing, Haas School of Business, UC Berkeley

The purpose of Prof. Zettelmeyer's presentation was to outline the impact e-commerce has had in the area of car sales, to outline legal obstacles to particular models of e-commerce in car sales and to present his research design for an upcoming study of car pricing as affected by Internet referral sites.

Although a car is a product that does not seem to lend itself to online purchasing because of the "tire-kicking"-expectation (similar to the "touch&feel"-expectation in textiles and apparel), data reveals that a majority of Internet users have used the web in conjunction with purchasing a car. In 1998, \$18 billion in car sales involved the Internet and a 1999 survey revealed that almost a third of US car dealers use the web for commercial purposes. The key to understanding these figures in spite of the product characteristics is that there are many car-related services that can easily be provided through the Internet, such as model information, price comparisons, trouble shooting, service scheduling or online "town hall meetings." Many of these services are provided by third parties who commonly offer services far superior in quality than those offered by the actual manufacturers.

The obvious B2C e-commerce model in the car industry, the online sale of vehicles directly from manufacturers to consumers, is ruled out by laws that prohibit such disintermediated transactions. As a result, most B2C business models in car sales are currently in the area of (1) information services, (2) referral services, and (3) aggregate buying services. There are currently two types of buying services, those run by associations of dealers (such as greenlight.com) and those run by brokers that offer cars at prices that might require subsidies in case negotiations with manufacturers yield prices higher than the ones agreed upon with buyers (an example would be carsdirect.com).

Zettelmeyer considers referral services as the most interesting of new Internet-enabled business models and is planning a major study that could offer broader insight into the Internet's effect on commerce. Referral sites such as autoweb.com link potential purchasers to dealers in their region and thus function as new intermediaries. Data shows that referral sites drive a significant amount of web traffic. A BMW dealer in Santa Clara, for example, receives up to 400 referrals per month. The conversion rate is typically one sale for every four to five referrals, thus making referral services very lucrative for dealers. While referral sites train the staff of associated dealers and require specific dealer services (such as staff specifically for referred clients, no haggling and lowest possible prices), referral site operators have no control over final prices and a very limited flow-back of information. Nevertheless, it seems consumers referred by referral sites pay on average lower prices than ordinary consumers. Why? Zettelmeyer offered three competing hypotheses:

1. *Price discrimination* – the Internet allows dealers to price discriminately as dealers know that web-referred customers are likely to be the most price sensitive. Hence, dealers tailor offers accordingly.
2. *Competition* – dealers compete with one another for affiliation with referral sites due to the commonly exclusive relationships between dealers and referral sites and offer low prices to retain the business of referred customers.
3. *Superior information* – since price margins depend on information asymmetries between dealer and consumer and the Internet is thought to dramatically increase consumers' access to information, the Internet strengthens consumers vis-à-vis dealers in price negotiations.

Zettelmeyer and his associates seek to determine the respective viability of the three hypotheses by analyzing a data set that combines data about all car sales compiled by a car marketing research firm and data about every referral undertaken by a major referral site. The findings could have broad implications. If the price discrimination hypothesis were to explain the lower prices for referred consumers, the Internet would be good for dealers as it offers an additional screening tool. If instead the Internet intensifies competition, we could expect a concentration of dealerships. If, finally, the Internet changed the balance of information in consumers' favor, the web would be bad for dealers. Zettelmeyer suggests, however, that a combination of the three hypotheses could be at play.

In sum, the Internet and e-commerce have impacted the area of car sales significantly despite the "tire-kicking"-expectation. Legal obstacles currently prevent direct sales and disintermediation. Consequently, new business models stressing information services and new intermediation have emerged. Referral sites in particular promise to be a valuable case to study the specific mechanisms through which e-commerce is thought to change the terms of competition.

Prof. Winfried Ruigrok, Professor of International Management; Academic Director of the Master of International Management Programme, University of St. Gallen (HSG), Switzerland

After the previous two presentations focusing primarily on the United States, Winfried Ruigrok's remarks were intended to give an overview of e-commerce developments in the European auto industry.

Ruigrok characterizes auto manufacturers as being slow in responding to the challenges and opportunities provided by the Internet. In part this is due to the many other challenges automakers currently face, with global consolidation being a very important one. DaimlerChrysler, for example, obviously still concerned with integrating the American and German parts of the company, was caught entirely off guard by the initial GM-Ariba deal that

launched the process of establishing a giant electronic marketplace for procurement in automotive parts. Nevertheless, e-commerce is affecting Europe's auto industry beyond the prospects of a single trading platform for parts, which is evident, for example, in the large number of start-ups offering auto services and products.

Ruigrok is convinced that the key concern for automakers is how to retain control over their end-to-end (E2E) networks. Ultimately, the impact of e-commerce will be huge. Entirely new distribution channels and business models are possible. European manufacturers, not prevented by law to sell directly to consumers, are already preparing direct sale strategies. Streamlining the entire E2E-chain via e-commerce technologies is almost certain to result in dramatic savings. The crucial question, however, is whether these savings will be reaped by manufacturers, suppliers, dealers or consumers. In order to maximize the benefits offered by the new technologies, manufacturers will have to balance carefully between incentives to outsource in order to save and the danger of losing control over key elements of the E2E chain.

Ruigrok shared Zettelmeyer's impression that cars sold over the Internet or sales referred through the Internet are cheaper, citing data that suggests that only 25 percent of British consumers using the web for car purchases do so because of lower prices. Superior information, convenience and the lack of haggling of online sales seem to have been just as, if not even more important than, the prospect of lower prices.

Lastly, Ruigrok pointed out that several European auto manufacturers have taken their own steps to develop web-based electronic procurement systems. Both Volkswagen and BMW have signed independent deals with Ariba to establish online exchanges. It is already apparent, however, that there is a need for greater standardization of supplies if the exchanges are to yield the anticipated savings for manufacturers.

Dr. Robert Boyer, CEPREMAP, France; Director, European Auto Project

Robert Boyer offered detailed critique of MacDuffie and Helper's paper in particular. He stressed at the outset that historical trajectories matter and that e-commerce is largely about organizational change and not simply about technology. A fundamental change of car design (i.e. toward modularization) is only possible if breakthrough innovations in terms of cell efficiency, standardization of the engine and complete redesign of the car take place as well as organizational structures change in a way that permits such a move. Consequently, institutions will matter a great deal in shaping these developments, and we might not see a single model of "e-effected" automakers but several, conceivably varied along national or regional lines as a result of fundamental differences in legal and regulatory frameworks.

Boyer thought the two scenarios presented in MacDuffie's and Helper's paper do not operate on the same level. The first scenario traces the implications of an internal paradigm shift in car design. The second scenario, by contrast, addresses the issue of information flow within the existing E2E chain in the industry. Mixing of complexity and complementarity makes the analysis more difficult. It was proposed to consider more seriously a third scenario in which the car would be conceived as a platform for an intensive use of communication and information technologies.

Moving beyond MacDuffie and Helper's analysis, Boyer suggested that we should not only be concerned with potential savings to consumers as a result of e-procurement but also with potentially increased productivity and quality. Furthermore, Boyer stressed that both B2C (in particular in conjunction with BTO) and B2V e-commerce will provide manufacturers with extremely valuable data about consumer preferences that can be used for more effective marketing and product innovation. How is such data accounted for in manufacturers' incentives to pursue e-commerce strategies?

Lastly, Boyer highlighted that the Internet did not seem to create pure and perfect competition as is often alleged. Instead, it appears as if e-commerce technologies increase the potential for price discrimination according to customer status and technological sophistication.

Given the importance of organizational characteristics, legal and regulatory incentives and constraints, and the effects of future information asymmetries on markets, Boyer urged to refrain from technological determinism driven by a monodimensional concern for transaction costs and instead suggested an appreciation for contingency. First, according to the evolution of the bargaining power of the various actors involved, the benefits from e-commerce may totally differ from one scenario to another. Second, each car maker may exploit e-commerce according to the requirement of its own profit strategy. For example, cutting production costs and optimizing the joint design with sub-contractors for Toyota. Getting a higher rate of return on capital by a better product mix for General Motors and Volkswagen. Fostering innovation and flexibility for Honda or Chrysler. Third, the legal framework may continue to differ significantly across nations and regions, even in the era of the net economy.

Open Discussion

Prof. John Zysman summed up the threads that he saw running through the presentations. Obviously, the business press treatment of what is happening is over-simplified. The current set of transformations is highly complex and

includes at least three main issues: First, business models affect the way technology tools are used and differences of business models across sectors or regions result in different technology usage patterns. Secondly, institutional factors play significant roles in the process of adaptation. Thirdly, politics and policy are important as organizational structure and technological systems are embedded in broader political and legal systems.

Prof. Martin Kenney argued that both **Prof. MacDuffie** and earlier **Prof. Hammond** had suggested that customers might pay a premium for BTO. However, in PCs, BTO actually leads to savings that Dell passes on to consumers. In response, **Prof. Susan Helper** once again stressed that cars are so much more complex than PCs that BTO in car manufacturing is likely to increase the price of cars despite the anticipated savings in the area of inventory control, speedier production and risk reduction through risk sharing.

Prof. Will Mitchell addressed the popular image that the Internet reduces the importance of geography and suggested that the scenarios outlined in the presentations require a great deal of face time between business partners. Supporting Dr. Mitchell's assessment, Helper argued that BTO and modularization require suppliers to be in the vicinity of the assembly plant and thus in a way increases the importance of geographic proximity.

Mr. Waesche sought to integrate MacDuffie's and Zettelmeyer's presentations and asked whether or not direct sales of BTO cars would render referral sites irrelevant and whether or not in either case dealers would be the big losers. In response, Zettelmeyer argued that both dealers and consequently referral sites are likely to disappear in the long run. The reason for studying the effects of referral sites does not lie in their being a crucial building block of the digital economy but rather their being a nice case through which to study how exactly the Internet affects commerce. Zettelmeyer also agreed with Boyer that the notion of perfect competition enabled by the web is silly and that we should focus less on the question of efficiency and study instead how the Internet, conceptualized as a communications medium, impacts information asymmetries.

Responding to the same question, MacDuffie argued that many referral sites are already in trouble as dealers have terminated relationships with referral sites in light of high subscription costs and draconian contractual terms. He is convinced that manufacturers will accelerate moves to BTO if they feel that e-commerce technologies reduce their profit margins substantially.

Given that EDI has played an important role in the auto industry for a long time, **Prof. François Bar** asked how EDI and the Internet compare and specifically what is new about using the Internet to integrate and tighten E2E chains. In response, Hammond suggested that the Internet differs from EDI systems in three important respects: first, web maintenance is cheaper than EDI development and maintenance. Secondly, EDI is generally conducted over proprietary networks whereas Internet-based, IP-powered exchanges are not. Thirdly, EDI involves only periodic data transfers whereas the web-based model is accessible 24/7 and allows instant information updates. The cumulative result of these differences is that whereas EDI fostered specific and often exclusive relationships between automakers, large suppliers, and IT providers, web-based models have low barriers to entry, minimal switching costs and should consequently be accessible even for small- and medium-sized suppliers. In addition, Helper stressed that computer-aided design (CAD) via EDI becomes very expensive if a manufacturer wants to work with several suppliers at once. The web's single, open standard simplifies working with several suppliers tremendously, just as it simplifies working with several manufacturers for major suppliers.

Prof. Ruigrok highlighted that some of the issues discussed are not entirely new. Manufacturers have tried to squeeze out intermediaries for quite some time. In response to a question by **Prof. Steve Cohen** about the legal position of auto dealers in Europe, Ruigrok explained that European dealers do not enjoy legal protection comparable to their US counterparts and that VW in particular is exploring the direct sales venue.

Finally, **Prof. Arie Segev** drew yet another comparison with the PC industry and suggested that the real future value of cars could be in dashboards. Microsoft did anything to control the desktop. Giving away PCs can make sense if one believes the real value is in services. Can we see automakers in the future giving away cars because the real money is in the services and applications running off the dashboard?

Summary Proceedings: Session IV Trucking / Logistics / Food

This session featured presentations on two sectors, food and trucking, which are both traditionally made up of large, fragmented, competitive firms, but are changing structurally due to the opportunities Internet communication presents. Following Wal-Mart's example, the food industry firms are integrating their supply-chains in order to compete. This is changing the character of B2B relationships, which were generally uncooperative in the past. On the B2C side, Internet shopping has yet to become profitable and is limited by low volumes, high picking costs, and low density

delivery markets. Kinsey concluded her presentation saying that there is more room for market coordination than for market discovery (shopping) in the food industry online. Mitchell and his colleagues came to a similar conclusion about the trucking industry. Many trucking and logistics firms are using the Internet to improve their services and to improve communication, allowing them to organize more efficient deliveries, fill their trucks completely, and track deliveries more effectively. In addition, some trucking firms are taking advantage of the Internet's new opportunities by taking on extensive logistical and one-stop delivery services as part of their operations. Supply-chain management, mobile tracking, and increased access to information are improving the industry's operation. However, most firms are not yet undertaking more fundamental innovation of their businesses as the companies have yet to embrace new technology on a wholly new organizational level. Commentators agreed that the more fundamental adaptations to e-commerce, on the part of firms' and individuals' behavior, must be made in order for firms to fully realize the benefits of networked communication.

Chair: Prof. Steve Weber

“Electronic Systems in the Food Industry: Entropy, Speed and Sales”

Prof. Jean Kinsey, Professor, Department of Applied Economics, University of Minnesota; Director, The Food Retail Industry Center

“E-Commerce and the Changing Terms of Competition in the Trucking Industry”

Prof. Anu Nagarajan, Assistant Research Scientist, University of Michigan School of Electrical Engineering and Computer Science; Adjunct Assistant Professor of Corporate Strategy and International Business, University of Michigan School of Business Administration

Prof. Will Mitchell, Jack D. Sparks/Whirlpool Corporation Research Professor and Professor of Corporate Strategy and International Business, University of Michigan Business School

Commentators: Prof. Sara Beckman, Professor and Co-Director, Fisher Center for the Strategic Use of Information Technology (FCSUIT), Haas School of Business, UC Berkeley
Mr. Jeff Corbett, Senior Vice President of Sales and Marketing, DHL Airways, Inc.
Mr. Bruce Patty, President, MCGI

- **“Electronic Systems in the Food Industry: Entropy, Speed and Sales”**

Prof. Jean Kinsey, Professor, Department of Applied Economics, University of Minnesota; Director, The Food Retail Industry Center

Prof. Kinsey focused on the changing characteristics of the industry and especially the effect of electronic data interchange initiatives by Wal-Mart on incumbent players. The primary competitors for traditional grocery sales are not other grocers but takeout food, natural foods, Wal-Mart, and Internet shopping. The food industry has changed in recent years from a closed, atomistic business model to Wal-Mart's integrated supply chain driven by sharing information about retail sales with suppliers. Kinsey reflected on two pieces of economic theory that tie to e-commerce in this sector. First, in B2C, consumers have a constraint on resources (including time and appetite). The food industry can only grow as fast as population does. Second, network effects suggest that the more people you can get into the network, the better it works (but there is an optimal number).

The retail food industry is defined by a large number of producers and retailers and a smaller number of distributors all “fighting for a share of the stomach”. In the past, relations between manufacturers and retailers have been adversarial. Into this fragmented and independent system came a fierce competitor, Wal-Mart, which was able to lower retail prices by developing an integrated supply/demand chain driven by the sharing of information about retail sales in real time. As a result, Wal-Mart has forced the rest of the industry to adopt e-commerce business practices and cooperate with their suppliers. The concept of sharing information about sales with vendors and developing a continuous and coordinated flow of products was introduced to the rest of the retail food industry and institutionalized by a coalition of trade associations, some food manufacturers and suppliers and a few large chains under the name Efficient Consumer Response (ECR). However, adoption of this system was slow due to incompatibility of computer systems and the lack of adequate adoption to achieve positive “network effects.”

The next round of innovation in the industry came when Wal-Mart joined with other large retailers to approach the Uniform Code Council (UCC), the bar code designer. In 1999 they created the Collaborative Planning Forecasting and Replenishment (CPFR) system. The UCC created UCCNet, an open format electronic Internet interface for

retailers to use to build a B2B relationship with their suppliers. In response, competitors have set up GlobalNetXchange and the WorldWide Retail Exchange. E-commerce models have made economies of scale and scope more obvious to the largest retailers. Whereas before 1998 no nation-wide grocery chains existed, now there are several.

B2C e-commerce initiatives by traditional retailers have mirrored the less successful, purely internet-based firms such as Peapod. Internet shopping for groceries is still small with only 1 to 5 percent of the market. It may not save time and has not yet become profitable. Traditional retailers are mainly engaging in B2C e-commerce as a part of a bandwagon effect. The major problems are a lack of volume buying, picking costs are too high (charges are 60% of delivery cost), the size and density of markets are too small and consumers are not very forgiving for imperfect deliveries. Fifty years ago home-delivery of groceries was essentially abandoned by grocers for these exact reasons. Can the Internet correct for these inefficiencies?

An important factor in predicting the potential for B2C grocery e-commerce is to what degree people are willing to try new things and at what point people give up on something that does not work well. When surfing the on-line food selection, do consumers give up after 5 minutes or 30 minutes if the ordering/selection process is complex or obtuse? Does grocery shopping on-line actually save time? People are more likely to use e-shopping for their basic food stocks than for more selective items. There is potential for high market penetration for basic goods but not for fresh or leisure foods.

In summary, e-commerce seems to be leading to greater efficiencies and industry concentration (especially disintermediation in the middle of the chain). And, if web grocery buying works, it must be tied to a brick and mortar group. In the food industry there is more potential for B2B than B2C e-commerce. The opportunity in this industry, for e-commerce, is to find new ways to do business rather than shop online.

- **“E-Commerce and the Changing Terms of Competition in the Trucking Industry”**

Prof. Will Mitchell, Jack D. Sparks/Whirlpool Corporation Research Professor and Professor of Corporate Strategy and International Business, University of Michigan Business School (presenter)

The trucking industry in the United States is similar to retail food delivery in terms of fragmentation and competition. Many operators exist in different market segments, and margins are low (many small operators with 1-2 trucks and 95% operating ratios). Because of the highly competitive nature of the industry and the need to fill trucks with freight, i.e. cubing up (filling every cubic inch of the truck) and backhaul (returning from a delivery with a new delivery of goods, so the truck is never travelling empty), e-commerce is providing new ways for both incumbents and new entries to compete. E-commerce is driving industry definition changes and firm-level changes.

Industry definition changes include the rise of package express and logistics warehousing services, the increased need for information management, the growing importance of for-hire operations (substituting for private fleet) and small package motor carriers (substituting for less-than-truckload (LTL) fleets). New entrants are common, especially as information brokers. Traditionally, logistics and package delivery are not considered part of the trucking industry, but that is changing.

There are three dimensions to the Internet's impact on how trucking firms operate. First, the Internet is changing brokers' roles and the ways information exchange can occur. Second, real-time mobile tracking and communication regarding shipment status is now possible. Third, supply chain management is now becoming an important function of the industry. Carrier alliances and information exchanges are being used to increase network density, and users are increasingly looking for one-stop-shopping (integrated transportation services).

In their study, Prof. Mitchell and his colleagues look at the trucking industry to understand the relationship between IT use and economic performance. They posit looking at IT use in two ways: exploitation (increasing the efficiency of present tasks of a firm) and exploration (innovations in business models and organizational change). Initial survey returns presented very preliminary results: 75% of firms have some Internet adoption; the Internet is less than 10% of their technology investment; less than 5% of shipments are procured via Internet. E-commerce is essential for improving information management in the trucking industry, however Mitchell et al. are concerned that many trucking firms are simply adding tasks by adopting e-commerce without eliminating traditional business practices that may become inefficient as the new internet activities evolve. Firms are becoming more complex, and new information technology adoption may be a competitive necessity but may well not lead to greater profitability for most firms. To improve operations significantly, e-commerce requires organizational change; as in the case of Wal-Mart, firms in this industry, in order to engage e-commerce, must do more than layer the Internet on top of their current legacy of information systems and departmental hierarchies; they will need new technology and, especially, new organization.

Mr. Jeff Corbett, Senior Vice President of Sales and Marketing, DHL Airways, Inc.

Delivery density is the key to transportation or delivery services (e.g. the US mail owns the ultimate delivery density). One reason Webvan has not done well is because it has a lower delivery density than traditional package delivery service companies. In the future, Mr. Corbett predicts that those companies controlling the most efficient parts of the delivery chain becoming dominant in the industry. However, he also acknowledged that home delivery is very difficult to manage and very costly and that the US Postal Service has the advantage in that service. Corbett suggested that convenience stores might become consolidation points for undeliverable packages, to save re-deliver costs to trucking firms. There is a huge cost to the delivery firm when a package is undeliverable on the first or second attempt. However, the labor unions in the package delivery industry are presently against this because having to re-deliver packages actually creates and preserves jobs. This conflict might prove unresolvable.

The Internet is an excellent way to provide package tracking services. Delivery companies are discovering that knowing when a package will arrive is more important to customers than how fast a package is delivered. E-commerce is not a business fad but represents real gains to which industries must adapt. In conclusion, Corbett mentioned the spread of US transportation business practices to other parts of the world as US multinational corporations demand similar services abroad. This is a huge market opportunity for delivery firms, one for which the Internet will prove an invaluable operations resource.

Mr. Bruce Patty, President, MCGI

Mr. Patty outlined the main problem for Webvan and others in the food industry: order volume is too low. It takes too long to search and order many items on the web, so people do not order high volumes. When comparing store vs. Internet shopping, we must compare the fixed vs. variable costs of each. For a consumer, the variable cost of Internet shopping is higher than the fixed cost, while the fixed cost of store shopping is higher than its variable cost. The tradeoff is opposite for the retailer. It must be made easier for consumers to make a large order on-line, or else they will do their shopping themselves because of this cost trade-off, or retailers will make no profits due to low delivery volumes.

On the trucking industry, Patty pointed out that it might be interesting to explore the impact of Amazon on the trucking industry. Does the rise of Amazon shift gains in volume from truckers to small package deliverers (from TL to LTL)? Amazon faces a difficult logistical problem that transportation companies might or might not be able to solve. If a customer orders multiple goods, Amazon needs to decide whether to store and ship products of different categories (books, CD's, toys, etc) separately or together. Either method raises demand for trucking at a time when truck drivers are harder to find because of low unemployment in the US; availability of drivers is a limiter to growth in the trucking industry. To diversify their profit base and protect against the pitfalls of offering delivery services, many shipping companies are taking on logistics tasks for other companies (i.e. FedEx is managing Cisco's supply chain now).

Patty further described how e-commerce is now being used to do tracking for railroads. GPS devices are now being put on railcars to keep track of train cars and freight. Intermodal transportation will become increasingly important for this industry. Traditionally, rail has not had a reservation process for shippers because of the high costs of processing and tracking this information. The Internet will allow reservations and differentiated pricing, and hopefully increase profit gains for rail operators.

Prof. Sara Beckman, Professor and Co-Director, Fisher Center for the Strategic Use of Information Technology (FCSUIT), Haas School of Business, UC Berkeley

The importance of IT is in its potential to change behaviors, not just its service in tracking product flows efficiently (replace items on the shelf, etc.). For the consumer, this could mean being able to click on a dinner menu, rather than finding the individual items in their unique categories, when placing an on-line grocery order.

For the distributor/producer, IT enables collecting and analyzing different information on consumers. Firms now have better quality information and can therefore organize production and delivery in different ways. For example, a firm like Dreyers Ice Cream might not simply restock shelves with the exact item that was sold. Instead, because they understand, via their databases, the main types of customers they have in a given store (e.g., chocoholics, plain, funky), they can restock those shelves with "substitutable" products in these categories. This allows the firm more flexibility in production and delivery. Another puzzle that Dreyers presents is why it still does its own delivery. One possible explanation is that it wants to make sure the product is presented well on the shelves, but there may be other explanations. It is not clear when it is best for a firm to own its own delivery trucks. IT could make it more appealing for a firm like Dreyers to begin outsourcing its delivery; this would have a significant impact on the behavior of the firm made possible only by the Internet. Again, this change is organizational not technological.

Session V

“What Next? A Business Perspective”

The dinner speakers and the discussion following brought up three key issues. One, “e-commerce” is soon to be so pervasive that the term itself will be redundant. While the Internet is changing everything, these changes will be realized in ways we cannot predict. These changes will only be evident once firms fully embrace new technology and restructure themselves to accommodate it. Second, innovation takes place where old structures and behaviors meet new structures and behaviors; a relationship between old and new must be symbiotic in order for change to succeed for a firm. Third, speakers discussed how the Internet will affect quality of life and community. Will it bring with it negative externalities, or does its use improve as more people join online? Will the new economy benefit all or few? How will policy decisions, on a tax regime for instance, affect local communities? These more social-minded questions are also at hand when we discuss restructuring organization, business methods, and individual behavior.

Remarks: Mr. Joe Schoendorf, Partner, Accel Partners

Comments: Mr. Garrett Greuner, General Partner, Alta Partners

Mr. Niels Christian Nielsen, CEO, Catenas; formerly CEO, Danish Technological Institute, Denmark

Mr. Joe Schoendorf, Partner, Accel Partners

Mr. Schoendorf started off the evening’s discussion with a provocative question: When will the word “e-commerce” become so redundant that we stop using it? He continued by accounting the many times analysts have failed to predict the many changes that a networked economy will bring. While the network economy is changing many things, the agents of change (firms) now are not necessarily the ones that will be agents of change in this economy a decade from now. Adapting to a network economy requires a total change in thinking.

In 1973 in *The Third Wave*, Alvin Toffler predicted that by 2000 many Americans would be working at home in “electronic cottages.” He was, in an important sense right. His new thesis is that if you live long enough to see your children raise their children, there will be nothing in their up-bringing and life that you can relate to through your own life and up-bringing. “History will regard us as an in-between age.” The fastest growing group of Internet users are those over 65. The second fastest group is those under 20. The younger generation takes the Internet for granted because they do not know a world without it. That is in itself a fundamental change in society and thinking and will impact innovation and penetration of e-commerce in the years to come.

We are operating with the thesis that the Internet will change everything. But we think each new technology will change everything immediately, and then this change takes a while to happen. Once transformation actually gets underway, however, we always underestimate how completely everything does change. We are in the process of changing even those companies which make up the Fortune 500, the establishment. What would you have said if, in 1988, I had told you that of all the mini-computer companies only Hewlett Packard would survive? What companies will be the winners and losers in the next ten years? We cannot predict the changes, and their extent, which will determine that.

Wal-Mart approached Accel Partners not because they needed capital, but in order to set up Walmart.com with a totally independent management and business model. They had been trying to create their own on-line retail business for the last five years, and they knew they had exactly one more chance to get e-tailing right before they lost the market to someone else, namely Amazon.com. But they also knew they needed management that did not come from Wal-Mart itself. We helped them make a clean start with people from the outside, from the Valley. We created a Board of Directors with exactly four members: 2 from Wal-Mart, 1 from the Venture Capital firm, and the CEO whom we hired from outside. Jean Jackson left GAP \$50million in stock options on the table to join as CEO of Walmart.com. We believe this is the model for all new ventures: leave behind existing bureaucracies and make a clean start.

Mr. Niels Christian Nielsen, CEO, Catenas; formerly CEO, Danish Technological Institute, Denmark

Mr. Nielsen began by addressing Mr. Schoendorf’s statement that Walmart.com could not have been created inside the firm; he added that it also could not have been created by someone with no experience in retail. This raises the question of where real innovation takes place. It occurs where the old and the new meet; innovation cannot be generated from the inside, but neither can it be generated wholly from the outside.

Mr. Nielsen’s second comment concerned Mr. Schoendorf’s statement that “the Internet will change everything, forever.” The steam engine changed everything, but it was not the Industrial Revolution. Much of the change in the industrial revolution came from other social inventions that happened at the same time, such as private property,

family, nation, state, firm, company, leisure, private, public, work; we had to redefine what we meant by these terms. The revolution we are now experiencing will make us reinvent all these terms again.

The industrial revolution was a time of great opportunity, when people recreated their world and their children's world. We as the "in-between" generation are recreating the world. There is nothing permanent about this change. Information technology is something that has been socially created. Compare our situation with the one faced by entrepreneurs and firms in the early industrial revolution. They pillaged their workers, the environment, and then sought absolution afterward by creating charitable foundations. Today's firms also face important choices about, for example, whether this new economy will be winner-take-all or more egalitarian.

Yes, this is a moment of importance and change. And yes, the Internet will change everything forever. But this change depends on how we shape the future. We need to take our part in this change and take responsibility in this change. How will WE reinvent the world around new technologies? How will we acknowledge our responsibility for a new world? Are we interested in the countries that were left out of the Industrial Revolution? Are we interested in making them a part of the evolving world? We are the ones making these choices.

Mr. Garrett Greuner, General Partner, Alta Partners

Soon it will be silly to talk about "e-commerce." We no longer talk about "telephone-commerce" or "fax-commerce." It is all just commerce and we need to examine the "genes" of commerce. The dissemination of Internet technology has been as fast as any transformation we have witnessed, and its huge wave is making itself felt down to the genes of businesses. Venture capital has always been about technology, finding the high margin products that are going through a small number of heads. But E-commerce is, in a sense, technology-less. Rather it is about the re-engineering of business methods. How long will e-commerce remain a story about small Internet start-up teams—like Walmart.com—driven by venture capital?

With regard to Mr. Nielsen's comments, Mr. Greuner added that E-Commerce has been an American phenomenon so far. He speculated how this development will change as e-commerce becomes ubiquitous and more people in the US and abroad get on the net. One difference between the steam engine and the Internet is that the more people who use the Internet, the better. However, increased use of steam engines (or automobiles) can bring many negative externalities. What implications does this have for the sustainability of e-commerce and the potential depth of its penetration into individual lives? Seemingly, the Internet could prove to be a more powerful agent of social change than the steam engine was or could have been. Certainly this means that comparisons between the two technological transformations are not so straightforward.

For example, building a tax regime for the Internet is not inevitable; other options could arise. But we should build one sooner rather than later because the alternatives to an Internet tax regime are worse. The tax-free environment on the Internet is breeding companies in an artificial environment. In the near future, over 40% of transactions will likely to occur over the Internet and it is important that Internet companies get used to paying sales taxes. How this is done must reflect the uniqueness of this technological and social change, and thus could change the whole system of taxation nationally and internationally.

Open Discussion

The discussion brought out several themes relating to the opening comments' tone of optimism and awe at the potentialities of the Internet. The first theme was the future of the balance between B2C and B2B e-commerce. **Mr. Bob Glushko** asserted that in time all B2B will be electronic, but B2C will have a hard time eliminating bricks.

The second, and more profound, theme was the conclusion that e-commerce's effect on the economy will be more organizational than technological: Organizational structure itself is key to the success of new companies. If fundamental changes in business models cannot be engineered from the inside or the outside, as with Wal-Mart, one must ask what do/don't you take with you to the start up? It is the start-up organizational style and ethos that is hard to adopt. There are also old EDI legacy systems. It's better if many companies just start with new systems entirely, to avoid historeosis. The best Fortune 500 people are now starting to realize that their companies are better off building new web-systems from the ground up, not on 30 year old mainframe architecture. Schoendorf noted that young MBAs are taking jobs in start-ups because they realize the freedom to learn is in start-ups, not in cubicles in big organizations. This is another reason established firms cannot afford not to innovate and adapt their systems to the new economy; they will simply fail to recruit new talent.

On this same theme of industrial organization, Dr. Litan raised a question about the future of venture capital. Is it a money industry or a re-engineering industry? Even after the shake-out(s), venture capital represents a fundamental change in the financial industries. Mr. Schoendorf responded that we haven't had a shake-out but a correction. The shake-out is still to come. B2C will get (mostly) eliminated, but the infrastructure firms will hit new highs this year. A

lot of “angel” and venture capital money will go away forever. The vertical integration and re-engineering of venture capital itself may be bigger than what we, the venture capitalists, do elsewhere.

Lastly, the discussion called back to Mr. Nielsen’s point about the rest of the world, and how the engagement of e-commerce outside the US will eventually determine the success of e-commerce penetration even in the US, given the global nature of business relations. Why haven’t other countries, even the EU, had the same performance as the U.S.? Is this just a lag or is something different happening? Mr. Nielsen pointed out the implications of combining two statements Mr. Schoendorf had made. If 1) we all get richer as more people get on the Internet, and 2) innovation comes neither from the inside nor from the outside, then we should conclude that the next round of innovation will not take place here in Silicon Valley. Mr. Schoendorf concluded that tolerance for risk has to change in the minds of those abroad in order for others to experience the technological and financial boom we have had here in the US.

Session VI

Electronics: Components, Data Products, Other Products

This session featured presentations on three segments of the electronics industry—semiconductors, personal computers, and hearing aids—each of which has undergone restructuring as a result of digital networking opportunities. For semiconductors, the Internet has enabled the separation of the design and manufacturing processes. This lowers investment costs for start-ups because they can outsource production, and the subsequent increase in the number of chip design firms drives innovation. For PCs, speed through the value-chain is the key to competitive production. Dell’s mass-customization model has been extremely successful in shifting inventory risk and depreciation onto the customer’s time. This is made possible by the efficiency of digital communication, both with consumers and along the production process. This strategy has essentially redefined the PC market, and established firms have been forced to adopt new strategies to compete for market position. For hearing aids network opportunities are still being explored, but there is great potential for this industry to follow the lead of other electronics industries by putting relationships between manufacturers and distributors online, thus streamlining the production process. Each of these cases demonstrates that while there are differences in where along the value chain e-commerce is proving most fruitful, all industries meet great opportunities to improve production, product quality, and customer service on the Internet if they adopt innovative organizational strategies.

Chair: Prof. Stephen Cohen

“E-Commerce and the Changing Terms of Competition in the Semiconductor Industry”

Prof. Rob Leachman, Professor of Industrial Engineering and Operations Research, UC Berkeley; Director of the Competitive Semiconductor Manufacturing (CSM) Program

“We All Want to be Like Mike: PCs and the Value Chain”

Prof. Martin Kenney, Professor of Human and Community Development, UC Davis; Senior Project Director, E-conomy Project, BRIE

Prof. James Curry, Professor, Colegio de la Frontera Norte, Tijuana, Mexico

“E-Commerce in Hearing Instruments”

Prof. Peter Lotz, Associate Professor and Head of Department, Copenhagen Business School, Denmark

Commentators: Prof. Rashi Glazer, Professor, Haas School of Business, University of California, Berkeley; Co-Director, Berkeley Center for Marketing and Technology; Director of the Berkeley Portfolio of Marketing Management Executive Education Programs

Mr. Michael Kleeman, CTO, Aerie Networks; former Vice President, Boston Consulting Group; Research Associate, BRIE

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- “E-Commerce and the Changing Terms of Competition in the Semiconductor Industry”

Prof. Rob Leachman, Professor of Industrial Engineering and Operations Research, UC Berkeley; Director of the Competitive Semiconductor Manufacturing (CSM) Program

Most people are surprised by the impact of e-commerce on industry restructuring. In the semiconductor industry, EDI systems enabled the separation of chip design and manufacturing. As a result, half of the world chip manufacturing

capacity is now in Taiwan. Economies of scale in wafer fabrication are key. However, the cost of building a wafer fab is high. As chip price is plummeting, time to market and speed differentiate market leaders in this industry. Driven by these competitive forces, the semiconductor industry is undergoing significant restructuring. Increasingly, EDI systems will be replaced by Internet-based systems.

First, new organizational forms have emerged. There are fab-less firms that carry out only design and marketing while the growth of contract manufacturers, called foundries, has been very high. These foundries specialize in process technology interfaced with commercial verification software. The split between design and manufacturing has been enabled by design verification software, web-based supply chain management, and the overwhelming interest in foundries.

There are several advantages for fab-less firms to use foundries. First, using foundries lowers the investment required for startups. Second, several large fab-less firms can jointly contribute to a foundry and spread the risk. Third, the discipline of design rules helps achieve a better use of process technology. However, there are some drawbacks, too. First, design verification software does not work on all designs. Second, foundries have less competitive process technology than large integrated firms, such as Intel and IBM. This has implications for quality, competitiveness, and the reach of innovation.

The semiconductor industry displays certain dynamics. First, where the fab-less and foundry relationship works, there is separation between product technology (design) and process technology (manufacturing). Second, where the relationship does not work, we see a few large integrated firms. Third, for mixed signal analog, there are both integrated and non-integrated firms. As a result, the foundry/fab-less relationship works well for digital logic, but is less successful for advanced memory. Some analog devices require considerable process tuning and are therefore not produced well outside of integrated semiconductor firms.

There are national differences in the use of contract manufacturing. The Japanese semiconductor firm strategy and structure does not favor foundries. American firms view foundries as a pooling of capital to build fabs, and not as outsourcing. The Taiwanese strategy is to solicit capital from American and Japanese firms. At present, 80-85 percent of the world foundry capacity is in Taiwan.

- **“We All Want to be Like Mike: PCs and the Value Chain”**

Prof. Martin Kenney, Professor of Human and Community Development, UC Davis; Senior Project Director, E-conomy Project, BRIE (presenter)

Because the PC has modular components, decreasing price, and depreciating value, speed in the entire value chain is the key to success in the PC industry. As such, the faster the PC moves through the value chain, the more competitive the firm. Michael Dell has become an icon of the Internet Age. Dell eliminated traditional distribution channels by applying a direct marketing strategy as the company moved its operation and its customers online.

There are several advantages to the Dell model. All of its PCs are built-to-order, so inventory risk is curtailed. Dell increases its control with its internal manufacturing. It only receives parts when the parts are needed, so the company drastically reduced inventory holding and depreciation. It also shifts depreciation cost to the consumers by manufacturing on the consumer's time (after order), not its own (before order). In the value chain, Dell absorbs other intermediaries' profits by doing direct marketing and moves the uncertainty upstream by sharing information to help improve its reception of parts, and thereby decreases the risk to its suppliers.

Dell invented a new organizational form that gave the firm competitive advantage in the industry and forced others to adopt new strategies. As an Internet-enabled firm, Dell did not provide much space for entry. (Barnes and Noble was not able to capture such an advantage in its competition with Amazon.) Pressured by Dell, new Internet entrants have competed through a number of business models such as Buy.com, Priceline.com, RosettaNet, or pcOrder.com. Dell's traditional competitors such as Compaq and IBM have been relatively slow to move online. Unlike Dell, these traditional firms were beset by channel conflict. For example, in 1998 existing channels complained to Compaq about being circumvented as Compaq began to be sold online. As a result, it had stop online sales of its one line and introduce new brand names. The difficulties were so great that Compaq also bought a distributor with four assembly and distribution facilities in the U.S. to cope with the challenge. Other firms such as IBM have discontinued the sale of PCs through retail channels and now mainly sell PCs as a part of a total solutions package. The increasing importance of total solutions provision particularly in the business sector is introducing the question of whether the PC is an object or a bundle of services? The answer is no longer straightforward.

What will the post-PC era be? The PC has been the onramp device to the Internet. The PC made the Internet possible, and now the Internet is changing the PC and even threatening to knock the PC out of its role as the primary Internet device. Now there are other products that provide Internet access such as wireless and handheld devices, set-top boxes and game machines. These latter machines could compete with the PC in the home. The third type of

product is the network computer (NC), which might compete with the PC in the office. The next challenge is to see how these products compete with the PC as the access device to the Internet.

One audience member commented that Kenney excluded a key product category: the application service provider. It is not surprising that Intel is now going into PC production. They are good at upstream manufacturing and now own ASPs. It is only natural that they fill in the "middle" of the production chain and produce PCs.

- **"E-Commerce in Hearing Instruments"**

Prof. Peter Lotz, Associate Professor and Head of Department, Copenhagen Business School, Denmark

The hearing aids industry is an interesting case of e-commerce because hearing aids are a customized product. Fitting to the user's ear channel is required. Therefore it is not a product we would expect to be easily sold or manufactured using Internet technology. However, as more software is embedded in hearing aids, the instrument becomes more digital and net-oriented. The hearing aids industry is dominated by five leaders. The large players are Siemens, Starkey, Oticon, GN Resound, and Widex. Each has 10 to 20% of market share.

An analysis of the industry value chain shows that e-commerce is not taking place between component manufacturers and the instrument manufacturers. However, there are two good opportunities for e-commerce. First, the web can facilitate a user's search for information. Research shows that people older than 65 are the fastest growing group of Internet users. However, hearing aid distributors are not readily equipped to provide adequate information to users via the web. There is some potential that distributors can set up hearing tests via the web.

The second opportunity for e-commerce is between instrument manufacturers and distributors. The barrier that impedes the instrument manufacturers from direct selling to end-users is the fitting requirement. A new product is currently being developed which may lead to a hearing aid that does not require fitting. With such innovation, the e-commerce potential for direct sales becomes more promising. Another possibility to enable direct sales is to have distributors measure the ear and send the measure to the instrument manufacturers. In that case, standardized communications becomes important. In short, e-commerce is driving consolidation and changes in the production and distribution processes of this industry in surprising ways.

Prof. Rashi Glazer, Professor, Haas School of Business, University of California, Berkeley; Co-Director, Berkeley Center for Marketing and Technology; Director of the Berkeley Portfolio of Marketing Management Executive Education Programs

Glazer asked Leachman the question. "With the Internet, there is disaggregation between design and manufacturing. Is there further divorce within manufacturing?" to which Leachman replied: Divorce within manufacturing or process technology has been a failure. The Japanese tried to license the DRAM technology to Taiwan, but was unable to succeed.

Then Glazer made general comments, arguing that Kenney did not place as much importance on brand as he should have. In Glazer's view, Dell's model accentuates the importance of brand recognition. Dell saw itself as a distributor of Microsoft and Intel, which are firms with strong brands. This helped Dell to focus on improving its channel of distribution. In contrast, Dell's competitors, Compaq and IBM, often saw themselves as rivals to Intel. In an era of e-commerce, being a distributor is even more important now because a distributor best knows the end-users. Mass-customization turns customers into an asset. The battle is then who in the value chain will eventually own the customers. Brand and the relationship with customers will become particularly important.

Kenney responded that that Dell's achievement was integrating the distribution chain. E-commerce is forcing integration and disintegration across sectors, but in different areas of the value, supply, and distribution chains. The locus of integration or disintegration is an important question to ask in analyzing firms and sectors, and their success in the "e-economy".

Mr. Michael Kleeman, CTO, Aerie Networks; former Vice President, Boston Consulting Group; Research Associate, BRIE

IBM and Compaq were captured by their distribution channels. As a new entrant, Michael Dell was forced into the direct channel strategy because he had a lack of capital. He was lucky that the Internet came along. If not, his telephone-order based model may not have been able to continue to compete with incumbents in the industry.

On the subject of fab-less manufacturing, Kleeman had a question for Leachman: "What happens to the fabs that are left behind?" Leachman replied, using Samsung as an example, that abandoned fabs can be converted for developing innovative products. Kleeman continued by noting that the success of communications equipment firms in the US is due to fab-less manufacturing. Telecom equipment manufacturing used to be vertically integrated, and entry into semiconductor manufacturing used to be very difficult. However, fab-less manufacturing has removed capital barriers to entry. This, in turn, has generated innovation. This is very evident with the Internet. In addition to the

removal of capital barriers, the standardization of Internet protocols has made it easy to connect millions of computers on standard communications networks. This used to be a very difficult task.

Open Discussion

The discussion focused on manufacturers' organizational strategies, comparing more and less successful choices in the relationship between design and production. **Prof. Peter Cowhey** raised the example of Qualcomm, which increased its production speed by outsourcing its chip manufacturing to Korea and focusing primarily on its spectrum engineers. Mr. Kleeman emphasized that knowledge inside the firm is very important and manufacturing does matter. That is why foundries and firms like Selectron are doing so well. If we lose the manufacturing capability, it will take generations to grow it back.

Prof. Alberto Sangiovanni-Vincentelli argued that half of business is in design. B2B e-commerce enables the connection between design and manufacturing. He owns a company that provides an online meeting place like a medieval marketplace. Prof. Leachman commented that Sangiovanni-Vincentelli's medieval marketplace could become an important nexus for innovation. Integrated firms may lose out. Process technology is very standardized in the electronics industry. Designers apply standardized design rules so no foundry is specialized.

Prof. Juan Peire brought the discussion back around to the topic of e-commerce directly, noting that the Internet's contribution to manufacturing is in improving the quality of communication along the production process. He argued that the real significant change in the business model is the delivery of digital goods. Kleeman offered that an open network system enables increasing returns. As we have learned from the case of the Internet, there are three key main drivers for increasing returns. First, innovation comes from an open environment. Second, an open platform encourages application development. Third, synergy and an open network increase collaboration.

Session VII

Media / Finance / Brokerage

The Internet provides potentially unlimited access to information, which in the case of the finance industry changes the role of intermediaries or brokers. This increased access to information creates a market transparency that then has two residual effects. Firms' research loses value to investors, who can now get this information on their own, essentially bypassing brokers and depriving them of their role (and profits). These intermediaries then, by necessity, adapt to this by changing their own business strategies. One example is differentiated pricing: setting prices to attract profitable customers. Brokers are starting to compete for customers not on a quantitative basis (market share) but on a qualitative basis (profitability). Successful adaptation must be done with speed, but the finance industry is still quite traditional and based on an establishment. There is a cycle: Innovating business practices, as a reaction to e-commerce, requires that more services and business relationships be transferred online, but a firm cannot transfer its business online successfully without developing adaptive organizational structures. There is, as of yet, no new business model for the finance industry in the new economy, and regulatory policy is lagging years behind. The short-sightedness of today's business models in the finance industry represent that the new economy is not the revolution itself but a transition.

Media, in contrast, is a highly adaptive industry, one which contributes opportunities to those participating in the e-commerce revolution at the same time that it has huge advantages of its own to gain from networks and network technology. Music distribution, for example, has provided the content for many start-ups while at the same time the music industry could gain a lot from networking their distribution digitally. On the policy side, though, there are many sticky issues, namely copyrights, which arise. The largely unregulated or undefined nature of e-commerce policy must catch up before self-governance and the courts set even more inconsistent standards.

Chair: Prof. John Zysman

“The Future of Retail Financial Services: Transparency, Disintermediation, and Differential Pricing”

Prof. Eric Clemons, Information: Strategy, Systems, & Economics Group, The Wharton School, University of Pennsylvania

Prof. David Croson, Assistant Professor of Operations & Information Management at the Wharton School of the University of Pennsylvania; Senior Fellow, Wharton Financial Institutions Center; Academic Director, Strategies for E-Commerce Program

“e-merging-media™- Media and the Challenge of the Internet”

Prof. Axel Zerdick, Professor of Economics and Communication, Freie Universität Berlin; Dean of the Department of Political and Social Sciences

Commentators: Mr. Peter Harter, Vice President, Global Public Policy and Standards, E-Music
Mr. Richard Meister, CEO, eBondTrade.com
Mr. Henry Lichstein, Vice President, Citigroup, Corporate Strategy
Prof. Arie Segev, Professor and Co-Director, Fisher Center for Information Technology and Marketplace Transformation, Haas School of Business, UC Berkeley

Lunch Discussion

Opening comments by Mr. Lewis Coleman, CEO, Bank of America Securities

How Do the Sectors Add Up?

Chair: Prof. Martin Kenney

Discussants: Prof. Bradford De Long, Professor of Economics, UC Berkeley
Dr. Robert Litan, Vice President & Director of Economic Studies, Brookings Institution; Cabot Family Chair in Economics

• **“The Future of Retail Financial Services: Transparency, Disintermediation, and Differential Pricing”**
Prof. David Croson, Assistant Professor of Operations & Information Management at the Wharton School of the University of Pennsylvania; Senior Fellow, Wharton Financial Institutions Center; Academic Director, Strategies for E-Commerce Program

According to Croson, the principle issues e-commerce raised for the finance industry are transparency, bypass, and differential pricing.

Transparency changes the distribution of information, increasing consumer power. A small change in information distribution makes a huge change in profitability (elasticity of information). One example of this impact is the big bang that occurred on the London stock exchange when it switched to an electronic system of trading in the 1980s. The result was a 60 percent increase in shares sold, and market makers' profits plummeted because market makers lost their power over information asymmetries with the consumer. Market makers had made their money on consumers' buying high and selling low. Croson defined two kinds of intermediaries in financial markets. Active intermediaries try to buy low and sell high to customers. Transparency kills this strategy. Passive intermediaries want to make the trade happen; they make money on matching people up. Early on in the game, e-commerce helps passive intermediaries, but there are decreasing marginal returns associated with getting better information. One collects only enough information to make the market clear. Active intermediaries need to get a lot of information. Is disintermediation occurring? No, it seems more a case of competitive entry. New companies entering the market are putting pressure on old intermediaries.

Bypass is another way of describing disintermediation, essentially ceasing to use full service retail brokers to access investment information. Discount brokers who are connected to market makers and take low or no commission have developed. Firm research is becoming less important as consumers have access to their own information. Is bypass a safe strategy? As an analogy, could British Airlines circumvent travel agents? Technically yes, but they risk a backlash by the travel agents. When is a market vulnerable to bypass?

- When the market is easy to enter – a regulatory change occurs or performance changes
- Worthwhile – profits are available
- Incumbent cannot defend – prior commitments prevent flexibility, i.e. BA is leveraged so they cannot afford travel agents' diverting their business.

Differential pricing refers to pricing the stock vs. pricing the trade. Firms are beginning to price for different customers. Those customers with more information should be charged more for a trade because they must know more than the market maker. Market entrants should develop a customer base that allows them to separate the desirable customers from the high cost customers. The old intermediary cannot rid itself so quickly of old customer obligations. So the new entrant skims the best customers while the older company is left with high costs. A successful new entrant should design the product such that profitable customers self-select its services. When transparency is high, profits still exist but only by focusing on attracting profitable customers rather than on cornering market share.

- **“e-merging-media™ - Media and the Challenge of the Internet”**

Prof. Axel Zerdick, Professor of Economics and Communication, Freie Universität Berlin; Dean of the Department of Political and Social Sciences

Media industries have evolved over long periods of time and have specialized in various ways. Printed media (books, magazines, newspapers), music, film and broadcast media (radio and television) have developed different business models adjusted to customers' needs, market forces and regulation. General similarities overlap with specifics resulting from local, regional, national and cross-national influences; cross-media business models have been emerging in various forms.

The advent of the Internet has eroded traditional value chains by introducing new channels of distribution, new ways of differentiating products and services, new competition, and new types of alliances. Convergence of IT, telecommunication and media, however, is not limited to the Internet: new methods of production and of distribution have been introduced before and are being used (in part) independently.

Media industry incumbents face fascinating challenges and threats. New entrants already have made a few significant inroads into specific territories of media industries. The most popular business models of Internet companies (and companies from other industries grappling with establishing an Internet presence and with creating E-commerce applications) are shifting to include media content and its organization. Inherent (but often hidden) strengths of traditional media and inherent strengths of traditional media companies (who often are unaware of them) give them an overwhelming chance not only to succeed, but also to rise to new levels of relevance. Intelligence and speed, however, will be deciding forces for survival and success.

Mr. Peter Harter, Vice President, Global Public Policy and Standards, E-Music

E-commerce is a unique opportunity for the music industry because music can be digitally delivered to the customer immediately. In times of brick and mortar stores, CD distribution was not sufficient to meet worldwide demand and the music industry was often referred to as the “\$100 billion industry in a \$40 billion suit”. E-commerce is capable of unlocking this difference.

Music is offered via the Internet in three different ways. First, music can be downloaded and stored locally by each customer (i.e. emusic.com). Second, music can be stored at the music provider and be accessed by customers (i.e., mp3.com, though on April 28, 2000 the courts found this to be a copyright infringement). Third, music can be stored and shared by different customers (i.e. napster.com).

The distribution of e-music raises several legal questions, mainly regarding copyright and privacy law, the latter particularly in the case of napster.com, where customers share their hard-drive with other customers. These issues are currently being dealt with via courts or self-governance bodies, and the need for coherent policy is increasing.

Mr. Richard Meister, CEO, eBondTrade.com

Two-hundred fifty billion dollars in municipal bonds are issued every year, and a lot of big players are fighting for this market. Fifty new companies entered the scene in the past 12 months. While new entrants try to transform the market, most of the (former) big players put a lot of effort into hindering this transformation.

Generally, it can be observed that as financial intermediation is shifting towards the Internet, banking innovation cannot exclusively be observed on the East Coast; the West Coast is already to play an increasingly strong role.

Mr. Henry Lichstein, Vice President, Citigroup, Corporate Strategy

The basic functions for doing business in the physical world have to be moved to the Internet one by one before the elaborations that are possible on the ‘Net can be put into play. Business’ transition to the new economy goes through a shop-pay-use cycle: Companies start using the web to sell products; they continue to invoice off-line; then the next advance occurs when payment becomes web-based; finally, customer service gets integrated into the on-line company. This last phase helps the company improve its shopping services, up-grading the cycle. Essential aspects of the business need to be transferred to the web and then new techniques can be expanded and invented on the web. As functions move over to the web, the number of intermediaries increases. A few intermediaries will eventually dominate the process.

Dr. Arie Segev, Professor and Co-Director, Fisher Center for Information Technology and Marketplace Transformation, Haas School of Business, UC Berkeley

E-commerce issues are similar across sectors. The key question is adaptation speed, but conservative companies resist change. The characteristics of that adaptation are:

1. It is difficult to forget about core competencies. Many companies will need to reorient towards new applications of their product.

2. Priorities are inconsistent. Companies often focus on consumer interface but forget about time to market or functionality.
3. Customization must be executed appropriately otherwise consumer trust is lost.

Mr. Lew Coleman, CEO Bank of America Securities

E-commerce is transforming the financial industry in fundamental ways. The financial industry still needs to get business models and regulation right. The problem for banks in the new economy is shown in a simple statistic: Originally, 65-70% of the consumer wallet was given to banks. Now it is only 15-18%. For example, Charles Schwab has more deposits than Bank of America now. In the e-economy, transaction costs are decreasing, information (e.g. research reports) is cheaper and more available, the concept of stock exchanges is becoming obsolete. The e-economy means the NY stock exchange no longer needs to exist.

1. There is no longer a transparency problem – Ebay is as efficient as the exchange and much more transparent
2. Equity research is no longer important – Investment bankers are no longer needed in their current form, to provide information to customers/investors

A new business model might emerge – the trusted navigator. These organizations would help consumers with information collection by being a trusted advisor. However, most new start-ups in the banking industry are not based on adequate business models. An overall successful business model of a bank for the changed e-economy has not yet been developed.

Finally, Coleman defined four areas where public policy is moving too slowly: Privacy; Consumer Protection; Economic measurement; and Financial market regulation

Dr. Robert Litan, Vice President & Director of Economic Studies, Brookings Institution; Cabot Family Chair in Economics

Traditional thought says banking cannot be mixed with commerce, but the new, e-commerce economy contradicts that.

For 15-20 years the financial services industry has wanted to be a “one-stop-shop” with the conception that all financial services would become “house brands.” In 1999 they finally got what they wanted. In the meantime, however, the Internet had come along and consumers had decided they didn’t want one-stop financial shopping. The only Internet model for the financial service industry is Mr. Coleman’s “trusted financial advisor”. Financial service providers, however, are not competing only with each other. Rather they are competing with Yahoo!, MSN, etc. In this new competitive environment, law is once again lagging behind developments. In the past, banks couldn’t mix commercial and investment services. Under regulatory modifications beginning in 1989 and now more recently with the enactment of financial modernization legislation, this prohibition on banks’ mixing the two operations has been eliminated. It is ironic that the bill which finally gave banks what they wanted puts them again at a disadvantage in the situation as it has evolved.

How do we explain 3% annual U.S. productivity growth since 1995? 0.6% is the computer industry alone. Is it the Internet and e-commerce? It is not clear that the internet change will be additive or part of the current 3% productivity growth. According to Brookings calculations, the movement toward on-line B2B alone will win 0.25% annual productivity growth. How sustainable is this? These are all but parts of an evolutionary process that began with the IT revolution. Can we expect 3% productivity growth for another ten years? If so, we don’t need social security reform.

Who is responsible for this growth/transformation, the East Coast or the West Coast, the government or the private sector? There are two views on this. Those on the East Coast emphasize their contribution, particularly government’s fiscal policy since 1990, in bringing down the deficit, has contributed significantly to it. Those on the West Coast see this revolution as the product of the private sector.

Dr. Robert Boyer, CEPREMAP, France; Director, European Auto Project

On the question of government, Dr. Boyer suggested that when thinking about policy needs for the new economy, we should redefine the very agenda and non-agenda of a modern government, and not defend an obsolete conception of a large monolithic state. By the way, information technology may help in overcoming the organizational inertia of some public administrations. Case studies demonstrate the drastic reduction of costs due to e-commerce: are these efficiency gains a one-time gain or the beginning of an evolutionary process that would promote long term cumulative productivity increases? Between states and markets there are other organizational forms that could deliver the public goods required by the maturation of the net economy (software norms, security routines,...). Do not underestimate the tensions between the collective good component of information and knowledge and the private appropriation of its benefits. This is an old Marxist theme quite rejuvenated by the net economy. Similarly, information technologies alter the functioning of financial markets such as NASDAQ, and this evolution feeds back into the incentives to look for radical innovations. May be the next and more promising revolution is about the complete transformation of medical

research by information technologies and finally the complete redesign of healthcare. Finally, Dr. Boyer speculated that perhaps this boom is not a revolution in itself, but a transition to a “new, real revolution”, when private organizations, legislation, economic institutions, production techniques and logistic infrastructures will be totally redesigned.

Dr. Bradford De Long, Professor of Economics, UC Berkeley

Prof. De Long raised the question of organizational dynamics. For each dollar spent on hardware, \$10 is invested in adjusting an office to the new computers, changing the structure of the firm. Technology leaps are challenging organizational dynamics, changing the way business is run. We must recognize the magnitude of structural change associated with investment in computers and information technology. This represents a huge social investment. Furthermore, there is no guarantee that this investment has been made in the “right” things.

Second, information goods are far more amenable to customization than were the old metal-bending industries. Is this a new development or is this an extension of Alfred Sloan’s strategy at General Motors to beat Ford by offering customers greater options rather than a standardized product? It is clear, however, that choice and customization represent value. Customization of information goods leads to a paradox. One must see a good before purchasing it, but once seen, the incentive for paying for information goods disappears because the buyer already has the information. How does an “information broker” maintain incentives for customers to purchase information? Economists cannot imagine a market for information goods. This raises a second paradox: once you get control of information, network economies generate monopolies. In the past, governments reached a compromise tolerating the existence of oligopolies with a competitive fringe in the marketplace. Will this remain possible now or will we see a tendency toward monopoly and anti-trust regulation? Dr. De Long expressed pessimism about the capacity of the American judiciary to keep up with this task.

Third, the apparatus we use to measure the economy is broken. Many services (e.g. Encyclopedia Britannica) that used to be costly now flow for free over the Internet. These gains do not show up in national income accounting. Paradoxically, only the cost of advertising shows up, and these on-line costs show up in the costs of, for example, car production. Therefore, instead of gains we may measure a decline in productivity. This may happen very often as more things move from the realm of being paid for to the realm of being free. Somehow someone must pay for something. We cannot milk the day traders forever. Good ideas must get linked to appropriate business models.

Open Discussion

Lee **Price** began the discussion by saying that economists do realize that the rapid productivity growth in the U.S. involves more than computers. Three things taken together explain the recent leap in productivity levels:

- 1) The enormous investment in information technology and the rapid payoff from those investments. Given the rapid loss of value associated with IT equipment, and their short useful lives, businesses can justify investments in IT only because they are immediately very productive.
- 2) Greenspan’s bravery in convincing the other members of the Federal Reserve Board to allow the economy to keep growing, despite their fears that unemployment was getting too low, has contributed significantly.
- 3) Improved fiscal policy in the 1990s, as mentioned by Litan earlier, is the final critical factor driving exceptional U.S. growth in recent years.

Part of the reason many companies do not know what the right business models are, and they may well be different tomorrow, is the dynamic economic setting in which they operate. What looks like a business promising good profitability now, may face a lot of competition and no profits later.

Measurement of new economic developments is truly important but challenging. Economists at U.S. agencies have made some advances, but changes within and around companies are proceeding so rapidly it will remain difficult to develop statistical data and categories to keep up. Defining the industry category for new digital businesses is quite difficult. Measuring their real output is also daunting. We are now measuring the output of computers, for instance, by taking into account their processing power. Recent advances in GDP accounting and measurement help explain the seemingly rapid productivity growth of the US recently. This growth may have been happening slowly, over more time, however we could not gauge it. Even with these advances, it is still difficult to measure the value people are getting from “free” information.

Mr. Coleman responded to Price’s argument about business models’ relationship to growth by turning it around. Perhaps the productivity success is a result of having no business models. The issue of not having a business model due to excessive measurement uncertainty is really the case. But having no business model means bankruptcy for firms. The current trajectory, lacking strategic business models, is unsustainable.

Prof. Martin **Kenney** interjected sociological observations on the mobilization of masses of people around technology. Failure is positive for capitalism because it provides flow and experimentation. The brightest people get pulled into new firms, forcing old firms to consider how they can hold on to the brightest to help them through the transition. Technology has set loose a global liberation of people to create new knowledge. The Internet is about globalization, not just technology. Silicon Valley, on its own, does not make sense. Silicon Valley, in fact, needs finance and markets elsewhere. To focus on just Silicon Valley and E-commerce is to encourage “irrational exuberance” rather than a realistic return on competence.

Dr. Thanassis **Chrissafis** asserted that the Internet offers emancipation from time, space, and geography. At the conference, speakers have focused on intermediation, but the relationship between producer and consumer is more important. The correct concept should be P2C or P2B, where P is producer. We are witnessing a move from a system of internalized companies (with production, advertising, and distribution) to digital intermediaries who research what consumers want, then search for an appropriate product and producer. This is a significant innovation in business practice. These changes toward customization will produce other major changes in the marketplace. Education could be tailored to pupils. Will citizens be able to shop for the states of their choice?

Mr. Michael **Kleeman** remarked, in reference to Kenney, that the Internet is not the cause of globalization but a coincident development. As a result of this massive change and growth, the e-industry is lacking a timeline for strategic plans. Everything is happening so quickly that they are forced to experiment with the reorganization of themselves. This is not the fault of the Internet itself, but a result of changing business structures. This new, short-sighted model is not sustainable, it represents a transition.

Furthermore it may have a high price: the erosion of public infrastructure. People are leaving public technology jobs for the private sector, because the financial rewards are so high. For example, BCG is poaching 7 key individuals from one national lab for a start up venture. But what will the implications of this be for the public sector and for R&D in general? The innovation/research infrastructure is taken for granted and unless we answer to that it will erode completely and all innovation will be in the hands of private actors.

In conclusion, Prof. Steve **Weber** claimed that it is more advantageous to own a trading platform than physical assets. Institutions like the New York Stock Exchange, however, combine two important things: trust and a locus for regulation. It was said earlier that do not need to have the NYSE. However, it offers an element of stability and focus to the system. The digital economy is still lacking this element, which is why policy discussions remain challenging.

Summary Proceedings: Session VIII

The final session addressed networking from several different perspectives. Bar, in presenting a typology of commerce (conventional, net-aided, indirect e-commerce, direct e-commerce), emphasized the role of networks as architecture, and that control over architecture translates into control over the marketplace. With ownership of physical infrastructure decoupled from control of that infrastructure, the Internet represents a dramatic change from the character of previous communications media. Katz also discussed this separation of physical infrastructure from architecture. Owners of bandwidth often have little if any connection to the content flowing across it, and many content providers do not own bandwidth but outsource the information's transmission. The Internet revolution has in large part been fueled by the dramatic increase in capacity, or bandwidth. Capacity continues to grow dramatically, making sophisticated global information networks possible. Tuomi, in contrast, took the notion of “network” on a different level by focusing on social networks and on the interactions of social and technological network dimensions. For example, business-consumer relationships are changing drastically, and the difference between the two is diminishing because the Internet makes it possible for almost anyone to be a producer (of information goods, e.g.). Spiller approached networks from a marketing point of view and sketched out how the Internet changes firms' strategies of maintaining and building a substantial client network.

Chair: Prof. Peter Cowhey

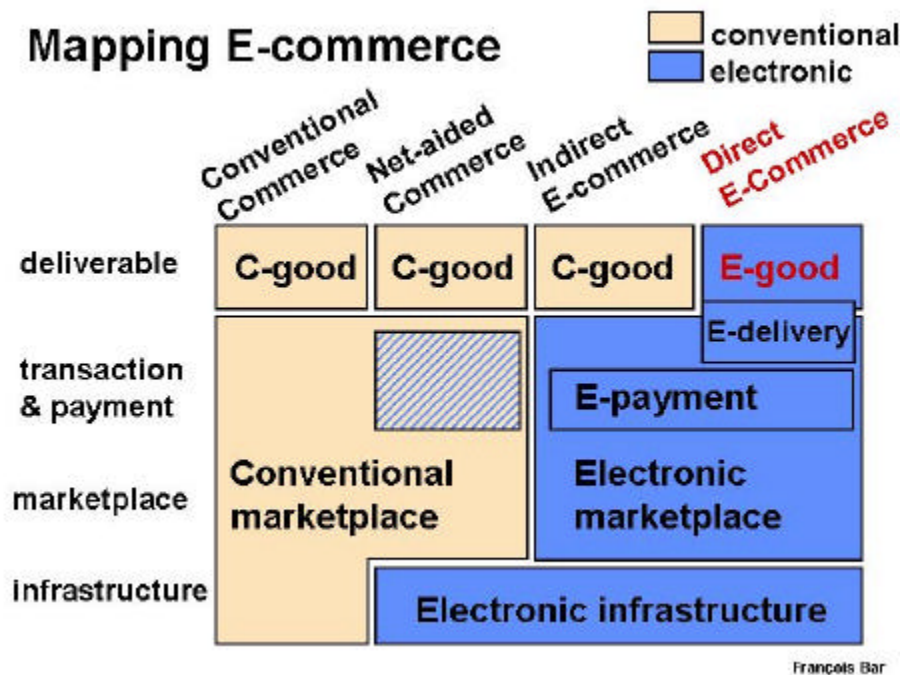
Panelists: Prof. François Bar, Professor, Communications, Stanford University; former Telecommunications Research Director at BRIE
Prof. Randy Katz, United Microelectronics Corporation Distinguished Professorship in Electrical Engineering and Computer Science
Prof. Pablo Spiller, J. Shoong Professor of International Business & Public Policy, Haas School of Business, UC Berkeley; Chair, Business & Public Policy Group

Prof. Peter **Cowhey** introduced the panel by stating that this topic returned the discussion nicely to the very roots of the evolution of electronic commerce: how will tools and networks shape both politics and business models?

Prof. François Bar, Professor, Communications, Stanford University; former Telecommunications Research Director at BRIE

Dr. Bar presented a conceptual framework of electronic commerce and addressed some of the myths about e-commerce that had already been exposed in previous panels. He stressed that the Internet may have lowered some barriers to entry but that we are far from a situation in which anyone can be a player. Similarly, Bar remarked that while the Internet may have enabled considerable disintermediation, new intermediation or reintermediation are just as common. Lastly, as has become apparent in earlier discussions, the only thing that could conceivably be friction-free in a digital economy are the networked computers themselves. Almost every e-business model seems to rest on real or artificially created friction (or stickiness) to generate business.

Returning to the idea of a simple framework of e-commerce, Bar presented a typology of commerce: (1) conventional commerce, (2) net-aided commerce, (3) indirect e-commerce, and (4) direct e-commerce.

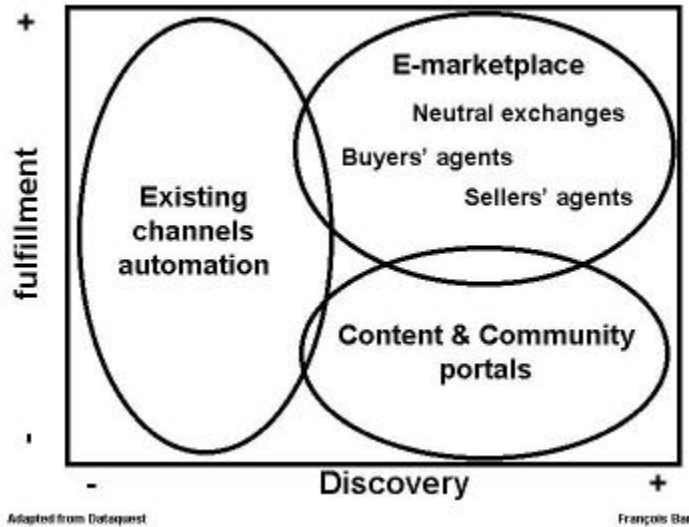


- (1) The infrastructure enabling conventional commerce was characterized by physical objects such as roads, bridges, piazzas and market squares and that the medium of exchange was physical money.
- (2) Net-aided commerce takes place when some aspect of the infrastructure is electronic (for example a system enabling electronic payment) while the general organization of commerce and the nature of the good exchanged remain similar or identical to conventional commerce.
- (3) Indirect e-commerce features an entirely electronic infrastructure with buyers and sellers meeting in electronic marketplaces and conducting the transaction online. The good exchanged, however, remains conventional in this model.
- (4) Finally, direct e-commerce is characterized by a fully electronic transaction and a good that can be delivered over a digital network (such as software, e-music, information...etc.).

Building on this categorization of e-commerce, Bar stressed that control over network architecture translates into control over marketplaces if the marketplace and the underlying commerce-enabling infrastructure are entirely electronic. Networks not only can be controlled in the last mile, but increasingly also in the backbone itself. Most

recently, the “gateway,” the link between local network and long-distance backbone, has become a potential locus for network control. Most companies are automating existing channels or putting information together as content and community portals. Everyone really wants to be in the last area, where the e-marketplace is, with new ways to organize electronic commerce.

How can network control be used as control over digital marketplaces?



The Internet differs dramatically from previous broadcast and telecommunications media in that it allows decoupling ownership of the physical infrastructure and control over that same infrastructure because content can easily be separated from the “pipes.”

Dr. Ilkka Tuomi, Visiting Scholar, UC Berkeley; Principal Scientist, Information Society and Knowledge Management, Nokia Research Center

The most important changes brought about by the Internet revolution will not be in the area of business models or industry organization but rather in the realm of social relations. Consequently, Tuomi takes “network evolution” not just to refer to the evolution of digital networks but just as importantly to refer to changes in social networks. Tuomi is convinced that the information revolution will lead to entirely new meanings for concepts such as “market” and “commerce” and that eventually we should aim to abolish the ideas of “consumer” and a fixed business/consumer divide. After all, the new digital technologies enable anybody to be a producer and seller of certain goods or services from almost anywhere and we are all in principle consumers of such goods and services, *if* they are meaningful to us. Rigid definitions of “consumer” and “business” with a fixed boundary between them thus does not appear very sensible.

Noting that much of the previous discussion had focused on *exploitation* of new technologies, Tuomi focused on *exploration*. What exactly happens when markets are redefined and how do social and technological changes interact in fueling innovation? Tuomi borrows from Schumpeter’s seminal work on innovation. In Schumpeter’s (1912) model, scientists and innovators create technological opportunities that are exploited by profit-seeking entrepreneurs. As more and more actors enter the new markets, substantial investments are made in market and industry structures are transformed. In his later work, Schumpeter (1943) supplemented this early model by suggesting that large corporations in particular assume the status of main investors in new technologies.

Tuomi links Schumpeter’s model of innovation to Perez’s (1985) work on the effects of new transformative technologies on the organization of production, investment patterns, demand for labor and international competitiveness, and argues that ubiquitous digital networks have played and continue to play such a transformative role today. Finance, for example, has been globalized and venture capitalists increasingly engage in business and industry reengineering. In terms of labor markets, the “stock option model” of compensation has created the possibility of quick wealth and has thus ensured the commitment of substantial human capital to the industry. Big corporations, often unable to identify and respond to new niches quickly enough, have adopted mergers and acquisitions as the key process through which to renew, thereby changing the terms of industry competition.

The transformative impulse goes beyond the realm of business models and finance patterns, however. Over time, Tuomi predicts, social institutions will change, taking advantage of new opportunities created by technological developments. The Internet will enable the erosion of the distinction between business and consumer and major innovations in technology and general knowledge will be the result of “collective production.” The rules of competition change dramatically in this setting as market economies become “symbiotic economies.”

Despite his depiction of social change coming in the aftermath of technological and industrial change, Tuomi stresses that his model is not one of technological determinism. In fact, much of the motivation that drives technological innovation is rooted in desires to alter social conditions.

Drawing a major conclusion from his examination of Schumpeter and of Perez’s idea of long waves of development, Tuomi argues that networks have not one but several policy-relevant layers. One of these is obviously the physical layer. Just as important, however, are the “logical/abstract”-layer and the social layer. The latter, in turn, can be broken down in the organization of production, communication, and the configuration of institutions and organizations.

To illustrate the importance of social institutions for the trajectory of technological developments, Tuomi examines recent developments in Finland. In terms of the digital economy, Finland is of course famous for its strong position in wireless technology. Not only does Finland have the world’s highest penetration rate of wireless services (expected to pass 100 percent in 2000), it is also at the forefront of mobile data with over two thirds of mobile traffic being data traffic. Recently, the first General Packet Radio System (GPRS) call was connected in Finland. GPRS provides for “always on” mobile Internet connections at 160 kbps. In addition to the wireless story, a Fin, Linus Thorvalds, launched the Linux open-source operating system. Linux software now runs almost as many servers as other server operating systems combined. Drawing data from the credit files of the Linux kernel, Tuomi demonstrates that Finland has by far the largest per capita community of Linux developers.

How can one explain Finland’s strong performance in wireless technology and open-source programming? Tuomi uses the example of electronic banking to highlight that the roots of the Finish success story are deep. Telephone banking began in 1982, equity shares were first traded online in 1988, mobile phone banking was launched in 1992 and Internet banking became publicly available in 1996. Given this long history of using new technologies to simplify customer financial transactions, it should not surprise that 82 percent of financial transactions in Finland were paperless in 1998 and that Finland has the lowest circulation of cash as measured as share of GDP (2.35 percent as compared to the EU average of 5.2 percent). Whereas paper checks were used in over 30 percent of customer transaction in Britain in 1997, the comparable figure for Finland was 0.7 percent.

Tuomi concludes his remarks by identifying some possible drivers of Finland’s innovation potential and its ability to diffuse new technologies quickly. Given the importance of network effects, the fact that all primary and secondary schools had Internet access in 1999 and that the Internet has been ubiquitous in universities since the 1980s certainly matters. Finland also has the largest per capita rate of Internet Top Level Domain (TLD) in the world. Not only that almost the entire society is networked, society as a whole is also very homogenous with comparatively low income differentials. Furthermore, high taxation of labor gives employers incentives to invest in technology and provides the government with considerable funds for investment in human capital and infrastructure. By OECD standards low telecom rates and the presence of Nokia as a global technological leader may also have played important roles in making Finland a model of the networked society that Tuomi believes is emerging in advanced industrialized economies.

Prof. Pablo Spiller, J. Shoong Professor of International Business & Public Policy, Haas School of Business, UC Berkeley; Chair, Business & Public Policy Group

Dr. Spiller organized his talk around the features of the New Economy, the way these features impact e-commerce and potential markets in terms of business strategy, and offered concluding remarks about the future of e-commerce.

Although an obvious e-commerce strategy lies in the exploitation of short term rents by offering intermediation services that are made possible by scalability, replicability and a reduced importance of geographic location, Spiller believes that competitive advantages of this kind are not sustainable in the long run. Sustainable competitive advantage in e-commerce requires successful management of the trade-off between the benefits and risks of “being local.” Local markets offer substantial friction that is worth exploiting. At the same time, however, competing in local markets implies competing not only with other e-commerce ventures but competing in particular with and against established brick-and-mortar business.

In general, sustainable competitive advantage requires a client base larger than that of competitors and relations with clients closer than those of competitors. Spiller calls this the “rolodex effect.” The superior customer base can be sustained by keeping customers in or by keeping competitors out. In each case, there are a variety of strategies to accomplish these goals. Customers can be kept in “artificially” by creating high switching costs (AOL). They can be

kept in “naturally” by utilizing an existing or fostering a new sense of community (Napster.com), and/or by tailoring services to the specific needs of a group of users. Competitors can be kept out of markets through market and non-market strategies. Market strategies include hiding one’s own technological resources, blocking access to one’s crucial information and engaging in continuous innovation. Here, however, companies face another trade-off: they may have to disclose substantial information about their venture and technology in order to attract customers while at the same time trying to prevent potential competitors from learning too much about them. This trade-off appears to vary across industries and markets. Non-market strategies for keeping competitors out can be divided into legal strategies and regulatory strategies. Examples for the former are patenting business models or parts thereof (eBay, Amazon.com), or taking legal action against newcomers (such as the music industry against MP3 and Napster). An example of the latter is the way long-distance carriers have successfully exploited rents through regulatory arrangements. Brick-and-mortar competitors can of course respond not only by seeking legal or regulatory protection (non-market strategies) but also by adopting a market response: either entry (Barns&Noble.com) or a merger (AOL / Time Warner).

In conclusion, Spiller suggests that the interesting battles will take place in the realm of non-market strategies and that these battles will define the future and character of electronic commerce.

Prof. Randy Katz, United Microelectronics Corporation Distinguished Professorship in Electrical Engineering and Computer Science

Dr. Katz offered a review of the Internet’s staggering development to this point and discussed the way the explosion of bandwidth has enabled entirely new business models and supply chain organizations.

Katz called the evolution of the Internet over the past five years entirely unexpected and compared its effects to that of a tornado: it came unexpectedly, shook everything up and ever since it hit everybody is trying to catch up with it. The key year was 1995. In 1995, there were seven Internet Service Providers (ISP). Today there are between 4000 and 5000. 1995 also featured the introduction of Mosaic as the first user-friendly browser as well as the run-up to the 1996 Telecommunications Act that fueled unprecedented competition in the long-distance backbone. Before 1995, Katz argued, the Internet was on a particular technological trajectory, one that was characterized by a single backbone and seven regional ISPs that were not competing against one another. In 1995, the Internet “tornado” hit. As a result, we now have 10s of backbones with global reach and numerable competing regional access networks. Katz noted, however, that the proposed merger of MCI WorldCom and Sprint would put more than half of the existing bandwidth capacity under the control of a single company. The merger may in fact be rejected for precisely this reason.

Responding to a question about possible growth limits of backbone capacity, Katz explained that there is no doubt the backbone will continue to scale. Recently, AT&T replaced OC-48 fiber optic cables, connections with a data transmission capacity of between 2.5 and 10 gigabits per second, with OC-192. Capacity shortages may occur in the area of local access networks because scaling is more difficult in the last mile. But even here the potential for continued growth is good.

It is precisely the availability of high bandwidth capacity even in local or regional networks that has fueled some of the growth of the Internet economy. Companies such as abovenet.com, for example, began offering office space on top of high-capacity connections as early as 1997. As a result, service and content providers could position their servers virtually in the heart of the network, close to where the network’s maximum bandwidth is.

One of many companies taking advantage of this abundance of high-speed, high-capacity network service is Yahoo!. Rather than building its own database of Internet content, Yahoo! links to Inktomi’s without a user’s noticing. Even business-critical, data-intensive parts of the supply chain can thus be outsourced because the abundance of bandwidth enables potential subcontractors to be “within reach” wherever they are physically located.

Similarly, the dramatic explosion of bandwidth and the abundance of service providers has freed companies that seek to build global data networks from actually owning the network’s physical parts. Katz called the partition of formerly monolithic things, i.e. the separation of control over data flows from ownership of the physical network, the amazing and entirely unexpected aspect of the Internet’s development.

Open Discussion

Prof. Cowhey opened the discussion by suggesting that regulatory games will always be played and that regulators will concentrate around a network’s (artificial or natural) bottlenecks. As an example of how regulators could be thought to break into a space that many have considered unregulatable, Cowhey explains that ICANN, the Internet Corporation for Assigned Numbers and Names, has successfully linked Top Level Domain (TLD) registration to the protection of intellectual property. Similarly, ICANN could in the future require applicants for TLDs to comply not only with intellectual property rules but also with privacy and data protection standards.

In response to a question by **Dr. Thanassis Chrissafis** about when the home could realistically become the location for commercial activity and thus effectively erode the business/consumer-distinction, **Dr. Tuomi** explained that e-commerce is not simply about selling goods and services. E-commerce, properly understood, is about changing patterns of education, patterns of work, etc. Technology makes these changes possible but the real story is in the social transformations that will ensue. Tuomi stresses, however, that technological change does not drive or even determine social change. Technological change results from human innovation, driven often by desires to bring about a certain way of life. Unintended consequences of technological change then open space for further social adaptation and transformation.

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