



The Technology Revolution and Its Implications for the Future

- Moderator: **David B. Yoffie**, Max and Doris Starr Professor of International Business Administration, Senior Associate Dean, Chair, Executive Education
- Panelists: **James W. Breyer**, Investor, Accel Partners
Susan L. Decker, President, Yahoo! Inc.
Eric B. Kim, Senior Vice President and General Manager, Digital Home Group, Intel Corporation

Overview

Computing power has become essentially free. There are free bits, communications, and content. The possibilities are limitless. The question is, "How will this technology be used?"

Without doubt, technology will continue to profoundly impact how people live, work, interact, and are entertained. Among the trends predicted by the panelists: greater organization and simplification of the massive amounts of information; greater connection of consumers through social media; use of technology by large companies to create competitive advantage; and the launch (again) of Internet TV.

Context

The panelists described the state of technology today and their view of where it is headed in the future.

Key Takeaways

- **To determine where technology is going, it is important to look at how far it has come.**

Much of what drives technology is Moore's Law, which states that computing power will double roughly every 18 months. Results of this continuous advancement in computing power include:

 - *The evolution of the Web.* First there was Web 1.0, which was about individual websites. Now emerging is Web 2.0, which is about user-generated content.
 - *The growth of broadband.* About 300 million people in the world have broadband access to their home.
 - *The explosion of video on the Internet.* Millions of videos are being posted to the Internet each month and the typical Internet user is spending hours each month downloading and watching video.
 - *The growth of cellular phones.* There are almost 3 billion cell phones in the world and 1.2 billion more will be sold this year. With the advent of the iPhone, cell phones are now "smart phones," capable of delivering high-quality content into a consumer's hand.
 - *The explosion of virtual worlds.* There are 217 million people who interact in virtual places like Second Life.

Other amazing developments include the fact that this year about a trillion free searches will be conducted; 200 billion minutes of free Internet telephone calls will be made via Skype; and hundreds of billions of video streams will come through "the cloud." In today's world, there is essentially

free computing, free bits, unlimited bandwidth, free communications through voice over IP, and increasingly free content. This is the landscape we have today.

And as profound as these changes are, the future opportunities are immense. While about 1.5 billion people have Internet access, about 5 billion people don't. There are 300 million people with broadband, but this represents only 20% of those with Internet access. Thus, only a small fraction of the world's population is taking advantage of technology's capabilities. Much growth potential remains.

- **One key technology trend: organizing, categorizing, and simplifying the world's information.**

The amount of information in the world and on the Web is exploding; each year more information is created than in all previous years combined. James Breyer believes that in the next five years there will be tremendous amounts of entrepreneurial energy focused on structuring, organizing, and categorizing the Web's information.

"Companies that sit in the midst of the information explosion and help understand how to structure information, communicate and categorize some of it, and then act on it . . . that is about as interesting a new investment thesis and set of initiatives as any in the information technology space."

— James W. Breyer

The organization and communication of information is what Facebook helps do. (Facebook is one of Mr. Breyer's investments.) It structures and organizes masses of information. Four years ago, Facebook had 800,000 users; today there are over 100 million.

Susan Decker shared a similar thought. Yahoo! sees itself evolving from a "portal" to a "platform." Yahoo!'s platform will provide consumers a simple dashboard where they can organize, customize, and simplify their Internet experience in a way that is relevant to them.

"People want simplicity . . . we think that the companies that are going to do well going forward are going to increasingly create a dashboard of simplicity that's open to the whole Internet."

— Susan L. Decker

- **Social media leverages technology to allow people to connect in newfound ways.**

In markets where the Internet is more mature, like the United States, the United Kingdom, Japan, or Korea, the



breadth of usage is leveling off, but the depth of usage is increasing as new ways to use technology take hold.

Many of the most significant applications of technology relate to how people communicate with each other and how people use technology in a natural setting as part of their day-to-day lives. Consider:

- Nine trillion emails will be sent this year.
- 12% of all newlyweds in the United States now meet online.
- 50% of people with handheld mobile devices sleep within arm's reach of their device, so they can pick up calls, emails, or text messages at night.
- Less than 50% of the people who have a handheld device are willing to share it with their partner, showing how personal these devices are.
- During the London bombing, video and pictures were on Twitter.com before they were in the mainstream media.

"There is a desire to connect with people and reach out and share what matters most and have your experience defined by people you care about."

— Susan L. Decker

The fact that Facebook has 100 million users, 70% of whom use it at least daily, is testament to how technology enables people to connect. Technology will continue to breed new ways to connect that become embedded in people's daily lives.

▪ **The next phenomenon in technology may be turning television into an Internet-connected device.**

While the Internet has been predominantly utilized on the PC, it successfully made the jump to handheld devices with the introduction of the iPhone. Mr. Kim predicts the next phenomenon in technology will be the introduction of the Internet to television.

Previous attempts to bring the Internet to TV have failed because they tried to treat the TV as a PC. Consumers want a different experience with their TV.

"Consumers don't want a PC-like experience."

— Eric B. Kim

Now is a good time to reintroduce Internet on the television. Consumers have embraced the Internet beyond the PC; they now expect the Internet to be everywhere. Also, the competitive dynamics of the industry have changed and seem ripe to be involved in this kind of innovation. There is now less fear in Hollywood and among content producers about offering free content via the Internet.

OEMs, satellite and cable service providers, television programmers, Internet players, and Hollywood content providers are all showing strong interest. Connecting the Internet to the television:

- Gives further power to consumers to watch what they want, when they want it.

- Will have a huge impact on advertising. Combining television and Internet will allow advertisers to combine the brand-building power of television with the efficacy and performance of online advertising.
- Changes the nature of television service providers. They currently are gatekeepers, distributing one-way content at low cost. Internet on the television will allow service providers to become more innovative in their service.
- Opens up the potential number of end-users. Intel is focused on bringing the Internet to the next billion people who don't currently have it. There is an even bigger market around the world that has televisions.

▪ **Technology is just as important for large companies as small ones. A major area of focus is integrating online and offline data.**

Discussions about technology usually focus on the latest innovative startup. However, technology is of huge importance for major companies such as Wal-Mart, which has built a 10- to 12-year competitive advantage through a technology called Retail Link.

Many companies—such as Wal-Mart, Target, Amazon, and eBay—are all trying to revolutionize the shopping experience by creating a better customer experience. They are trying to figure out how to integrate point-of-sale data from the physical world with consumer information that is being generated on the Web. To date, no company has figured this out. This integration of data from the physical and online worlds will receive a great deal of attention going forward.

Other Important Points

- **Internet business models.** Since bits, content, and connectivity are essentially free, the question is, "Who pays?" There will be multiple models to support services provided via the Internet, but it will clearly be dominated by advertising. Internet advertising is currently a \$45 billion global industry growing at 20% per year, but this still represents less than 10% of the total advertising market. Other models include subscriptions and premium services.
- **Past predictions.** Professor Yoffie looked at predictions from the mid-1960s about what the world would look like in 2000. Among the predictions were: Man would land on the moon; cities would thrive under climate-controlled domes; planes would fly from New York City to Tokyo in two hours; people would strap power boosters on their backs and fly to work; and there would be 200,000 computers in the United States. One other prediction made by a group of Harvard professors was that computers would be connected, yielding an array of benefits.

In general, these predictions overestimated changes in many areas but greatly underestimated the prevalence of information technology as there are about 300 million computers in the United States versus the 200,000 that were predicted. The prediction of connected computers was essentially a prediction of the Internet.



Speaker Biographies

David B. Yoffie (Moderator)

Max and Doris Starr Professor of International Business Administration, Senior Associate Dean, Chair, Executive Education

David Yoffie is the Max and Doris Starr Professor of International Business Administration and senior associate dean, chair, Executive Education. An HBS faculty member since 1981, Yoffie received his bachelor's degree, summa cum laude and Phi Beta Kappa, from Brandeis University and his master's and Ph.D. degrees from Stanford University, where he was a lecturer for two years and spent two years as a visiting scholar in 1995–1996 and 2002–2003. Yoffie served as chairman of the School's Strategy unit from 1997 to 2002 and of the Advanced Management Program from 1999 to 2002. He now chairs Harvard's Young Presidents' Organization program and teaches competitive and corporate strategy in the Advanced Management Program.

Yoffie's research and consulting have focused on competitive strategy, technology, and international competition. His outside activities include serving on the boards of directors of Intel Corporation (lead independent director since 1989), Enterprise Mobile Inc., and RingTales LLC. He is also a director of the National Bureau of Economic Research. Over the last decade, he has served on boards of numerous companies, including Charles Schwab, Spotfire, and E Ink. Yoffie has also lectured and consulted in more than 30 countries around the world. From 1997 to 1999, he was a member of the U.S. Department of Justice's commission on international antitrust.

Yoffie's writings on business strategy and technology have been widely published. He is the author or editor of eight books, including *Judo Strategy* (2001), coauthored with Mary Kwak. Translated into eight languages, the book explores strategic techniques for turning your competitors' strengths to your advantage. His other books include *Competing in the Age of Digital Convergence* (1997) and *Competing on Internet Time: Lessons from Netscape and Its Battle with Microsoft* (1998), coauthored with MIT professor Michael Cusumano. Named by *BusinessWeek* and Amazon.com as one of the top 10 business books of 1998, *Competing on Internet Time* became a highly publicized part of the Microsoft–Department of Justice antitrust trial. Yoffie has written extensively for the *New York Times*, the *Wall Street Journal*, and the *Harvard Business Review* as well as numerous scholarly and managerial articles on international trade, firm strategy, and global competition in high-tech industries. He has published more than 100 case studies on business strategy and international management issues, which have sold more than 1.5 million copies.

James W. Breyer, MBA 1987

Investor, Accel Partners

Jim Breyer has been responsible for Accel's investments in over 30 companies that have completed public offerings or successful mergers. These include Actuate, Agile Software,

Alphablox/IBM, BrassRing/Kenexa, Centillion (acquired by Bay Networks), Collabra/America Online, Datasweep/Rockwell, Foundry Networks, Groove Networks/Microsoft, Hyperion Solutions/Oracle, Lightspan/Plato Learning, Macromedia, Maven Networks/Yahoo!, Microprose, Motive, RealNetworks, RedBack Networks, Savista/Accenture, Synopsys, and Walmart.com.

Breyer is on the board of directors of Wal-Mart Stores Inc., where he is the presiding independent director and chairman of the strategic planning and finance committee. He also serves on the boards of Marvel Entertainment, where he is the founding chairman of the strategic planning and finance committee, and RealNetworks, where he is the presiding independent director. Breyer is an investor and board member of privately held companies BBN Technologies, Brightcove, Etsy, Facebook, Global Grind Digital, Model N, and Prosper Marketplace. He is on the boards and strategic investment committees of Accel-KKR and IDG-Accel China Fund.

Earlier, Breyer worked as a management consultant at McKinsey & Company in New York and in product marketing and management at Apple Computer and Hewlett-Packard. He has served as chairman of the National Venture Capital Association and president of the Western Association of Venture Capitalists. He is a director of Pacific Community Ventures, the Stanford Technology Ventures Program, and Technet; a trustee of the Menlo School; and a member of the HBS Board of Dean's Advisors. He is also chairman of the Stanford Engineering Venture Fund, former chairman of the HBS California Research Center, and former chairman of the Silicon Valley Region Committee for Stanford University's Campaign for Undergraduate Education.

In December 2005, Breyer was appointed an honorary professor at the 1,000-year-old Yuelu Academy at Hunan University in China. He received a BS with highest distinction from Stanford University and an MBA from HBS, graduating as a Baker Scholar.

Susan L. Decker, MBA 1986

President, Yahoo! Inc.

As the president of Yahoo! Inc., Sue Decker is responsible for all of Yahoo!'s global business operations, including sales, product marketing, product, and distribution across its three major customer groups of audience, advertisers, and publishers. From December 2006 to June 2007, she served as the head of one of Yahoo!'s two major business units, the Advertiser and Publisher Group, where she was instrumental in developing the company's recent reorganization plan and strategy to transform how advertisers connect with their target customers on the Internet. Before that Decker was EVP and CFO from June 2000 to June 2007, managing all aspects of Yahoo!'s financial and administrative direction within key functional areas, including finance, facilities, investor relations (and human resources and legal through December 2006).



Before joining Yahoo! in June 2000, Decker was with Donaldson, Lufkin & Jenrette for 14 years. Most recently, she served as the global director of equity research, a \$300 million operation, where, among other things, she was responsible for building and staffing a non-U.S. research product based on global sector teams. Before that she spent 12 years as an equity research analyst, providing coverage to institutional investors on more than 30 media, publishing, and advertising stocks. In this capacity she received recognition by *Institutional Investor* magazine as a top-rated analyst for 10 consecutive years.

Decker holds a BS from Tufts University with a double major in computer science and economics and an MBA from HBS. She also received the designation of chartered financial analyst in 1989 and served on the Financial Accounting Standards Advisory Council for a four-year term (January 2000 to January 2004). Decker served on the boards of Pixar Animation Studios until its sale to Disney (June 2004 to May 2006), and the Stanford Institute for Economic Policy Research (March 2005 to May 2007). She now serves on the boards of Berkshire Hathaway, Intel Corporation, and Costco Wholesale.

Eric B. Kim, MBA 1981

Senior Vice President and General Manager, Digital Home Group, Intel Corporation

Eric Kim is senior vice president and general manager of Intel Corporation's digital home group. Previously, Kim was general manager of Intel's sales and marketing group and served as its chief marketing officer, responsible for all sales and marketing operations worldwide.

Before joining Intel in November 2004, Kim was an EVP at Samsung Electronics Co. Ltd. He was responsible for global marketing and new-business development and helped make Samsung a leading worldwide consumer brand. Before joining Samsung in 1999, Kim had significant and varied experience in hardware and software marketing, product development, and venture investment management. During his five years with Dun & Bradstreet Corporation, Kim was president and CEO of Pilot Software and a chief technology officer. For Lotus Development, he was general manager of database products. *Time* magazine named Kim to its annual "Global Influentials" list in 2002.

Kim holds a bachelor's degree in physics from Harvey Mudd College, a master's in engineering systems from UCLA, and an MBA from HBS.