

Implications of Convergence Technology for Business Models

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Information Integrity/Integrity Information System/Management Information System

Course Lecture # 14

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PROLOGUE

PROLOGUE: GROWTH OF ICT-1

- Tools for recording on cave walls, cliffs, stone, wood,
- Paper, Invention of writing,
- Printing Technology, Typewriters,
- Telephone and Television,
- Computers,
- Fax and Recorders,
- Modem, e-mail, Computers on-line,

Growth of ICT-2

- LAN, WAN,
- World Wide Web,
- Digital communication, Bandwidth, Broadband
- High Speed Digital Networks
- Wi-Fi:
 - Better battery technologies, less power-hungry devices and improved use of radio frequency (RF) are making everything electric talk with everything else electric, using wireless communication.

Growth of ICT-3

- Ultimately, all long-distance traffic will be fiber and all short distance traffic will be RF.
- Internet telephony
- Wireless Web or Mobile Internet
- Impact of ICTs on information processing
 - Information explosion
 - Information Infrastructure
 - Information availability at any time, any place

Ten Technology Shifts: From Analog to Digital

Digital technologies for the Digital economy

	Old Economy Technology shifts from	New (Digital) Economy Technology shifts to
Signal	Analog	Digital
Processors	Traditional Semiconductor	Microprocessors
System	Host-Based	Client Server
Network capacity	Garden Path Bandwidth	Information Highway
Device	Dumb Access	Information Appliance
Information forms	Separate Data, Text, Voice, Image	Multimedia
System	Proprietary	Open
Networks	Dumb	Intelligent
Software Development	Craft	Object Computing
Interface	GUIs (Graphic User Interface)	MUDs (Multimedia User Interface), MUIs (Multi-User Dungeon, or Multi-User Domain, depending whom you are talking to), and MOOs (MUD, Object Oriented), etc.
Source: New paradigm Learning Corporation, 1996		

Convergence Technology

Components for Industry Analysis

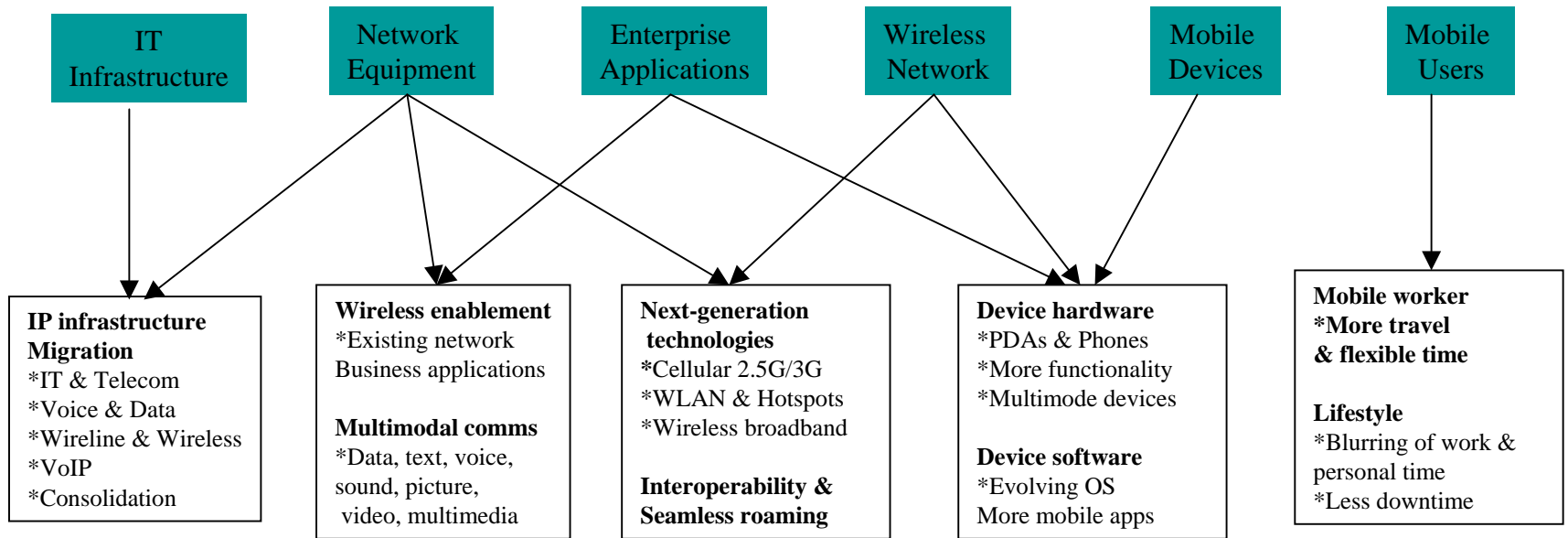
Communications	Computing	Content
Communications facilities	Computer equipment	Newspapers
Household A/v equipment	Semiconductors & related equipment	Periodicals
Telephone & telegraph equipment	Miscellaneous electronic components	Books
Broadcasting and communications equipment	Electrical equipment & supplies	Miscellaneous publishing
Communications, except broadcasting	Search & navigation equipment	Greeting card publishing
Radio & TV broadcasting	Computer & data processing services, software	Advertising
-	Electrical repair shops	Photocopying, commercial art, photo finishing
-	-	Business services
-	-	Motion pictures
-	-	Video tape rental
-	-	Producers, orchestras and entertainers
Source: List of Industry Classifications, U.S. Bureau of Labor Statistics; Don Tapscott, The Digital Economy, McGraw-Hill, Inc., USA	-	Libraries, vocational and other schools

What can ICT do?

- One is witnessing a second industrial revolution,
 - through ICT: the new information processing technology of communications and computers.
- "Convergence" of electronics, computing and telecommunications supported by moment by moment computer-aided optimization of processes and decision-making is now yielding enterprise-wide system integration opportunities.

- As these technologies evolve over the next decade (2004 forecast), a new world will emerge. Analysts predict:
 - Networks will speed up by an average of 50% a year, the historic norm.
 - In advanced world, faster broadband and mobile systems will be strong enough for commuters to check for traffic jams and watch soap operas on their cell phones.
 - In Japan and Korea, this is a reality in 2004 itself, while U.S. will catch up in a decade.
 - By 2009-10, practically every machine in the realm of communications- every gadget that sings, talks, beams images or messages- will sport powerful computer and a network connection. And every bit of digital information, whether it's phone call , a song, a Web page, or a movie, will flow among these machines in the very same river of data.
 - By the end of this 10-year-cycle (i.e., by 2010-15), the change could be extreme:
 - Web pages will snap to life.
 - Hundreds of thousands of political bloggers, flu fishermen, and chefs will be uploading gobs of video programming- creating their own channels.
 - This plethora of Web shows will compete for attention with TV fare, Internet radio, video e-mails, and games.
 - All of it will play on televisions, computers, and cell phones, which will be different flavors of the same machine. The concept of a network or a channel will go away. They are artifacts of old technology.

- The dramatic shifts ahead are likely to shakeup age-old concepts at the foundation of economic life. In the coming markets of moving bits, who owns what? Will people buy programming and machines? Or will they rent and subscribe? Innovative companies will sort out these questions, leading the way in building new business models for the coming age. Those who figure out how to reach through the networks to deliver customized information and services will be the architects and kings of the converged economy. Michael Moe, co-founder of ThinkEquity Partners LLC, a San Francisco investment bank, predicts that those people and companies will rise quickly. “Five years from now, it will be over,” he says. “The winners will be determined.”
- Said differently, the clock is ticking- pushing companies to hurry into bruising and unformed markets far from their roots and their expertise.
- The process, as Nokia Corp. can attest, is often humbling.
 - A year ago, Nokia Corp., the Finnish company, created N-gag, a handheld phone-game console designed to beat the consumer electronics champs into a new hybrid market. But its awkward design drew scorn from gamers, and today even Nokia admits the first version was a disappointment.
 - Then there is Intel, AT&T, and IBM joint venture in 2002 called Cometa Networks Inc. The goal was to link all the Wi-Fi hot-spots into one seamless network. But in May 2004 Cometa said it would shut down, the victim of fierce competition and an embryonic business plan. Say Sky Dayton, founder of Boingo Wireless Inc., a Cometa rival. “It’s hard to translate success from one industry into success in another.



Security considerations
 Strategy formulation
 Requirement design
 Information Integrity (I*I) Control
 Cost benefit Analysis
Information Economics (of Information Evaluation)

Business Information Planning for Competitive Advantage

Lecture #14

Implications of Convergence Technology for Business Models

SOME RELEVANT SURVEYS

- A survey of the mobile Internet (Economist October 13th 2001)
- A survey of the real-time economy (Economist February 2nd 2002)
- A survey of the IT industry (Economist May 10th 2003)
- A survey of e-commerce (Economist May 15th 2004)
- A survey of information technology (Economist October 30th 2004)
- A survey of consumer power (Economist April 2nd 2005)
- A survey of logistics-The physical internet (Economist June 17th 2006)

Main findings of these surveys are as follows.

A survey of the mobile Internet (2001)

- **Mobile Internet-What is it?-** The period is October 2001. Night-time on the neon-lit streets of Tokyo's Shibuya district and there are the colorfully illuminated skyscrapers and huge billboards, and there are the throngs of exotically clad teenagers. And everywhere there are people talking and typing into astoundingly advanced mobile phones-tiny devices that fold up like colorful make-up compacts, are incredibly light, and have small, vivid color screens capable of displaying sophisticated graphics. Most important of all, these phones enable their users to access the Internet while on the move. As early as 2001, in Japan, the Internet has gone mobile.
- The market and industry analysts forecast the mobile Internet application scene in Shibuya to be the future. The convergence of the two fastest growing technologies of all time will, it is forecasted, make possible all kinds of new services and create a vast new market as consumers around the world start logging on from Internet capable phones. Market-research firms and consultancies estimated the number of mobile Internet users to rise to around one billion by 2004, from 200m in 2001 (1million=10 lacs).
- The term "mobile Internet" itself is problematic. "Mobile data services" might be more like it. Other names that are bandied about include "the wireless web", "mobile e-services", and "mobile online services". But this survey refers to the emerging *mobile data/information environment* as the "mobile Internet", even though with the benefit of hindsight it may prove to be as much of a misnomer a "speaking telegraph" (For effectiveness of information use, this points to the need for recognizing data/information environment as that comprising both normative and factual information and not factual information alone). One attraction of the term is that the word "Internet" technically refers to network of networks, and that is exactly what the mobile Internet will consist of.

- Technological viability of the mobile Internet makes Internet-capable phone as the dominant design specification of the mobile device. First-Generation (**1G**) mobile phones, which have been around since the 1970s, use analogue technology to transmit voice calls. Sound quality is generally poor, use of radio spectrum is inefficient, and calls can be intercepted quite easily. Of the world's 800 m mobile-phone users, around 70m, mostly in the developing world, have 1G phones (October 2001 statistics).

Second –generation (**2G**) mobile phones use digital encoding. Communication between the handset and the base station takes in the form of an encrypted data stream, making eavesdropping almost impossible. As well as voice calls, 2G phones can also send and receive data, so they can provide limited data services such as text messaging and Wireless Access Protocol (WAP) browsing. Most mobile phones in use today are 2G.

Enhanced second-generation (**2.5G**) phones, which have recently become available (2001 statistics), extend 2G technology to offer improved data capabilities, such as higher transmission rates and always-on connections, so these phones can support more advanced data services.

Third-generation (**3G**) phones will offer high-speed, always-on data connections, as well as support for applications such as video-telephony and advanced data services with full Internet access. 3G networks are also designed to support large numbers of users more efficiently than 2G networks, to allow for future expansion.

- Year 2001 forecasts predicted that by 2004, the number of mobile-Internet users will rise to around one billion, from 200m in 2001. It was big numbers like this that prompted mobile-network operators around the world collectively to pay more than \$100 billion in year 2000 for licenses to operate “third-generation” (3G) networks.
- But the downturn in the technology sector, and elsewhere in the world’s economies, has cast a long shadow over 3G’s future. The huge debts incurred by operators in buying their licenses, and their need to cut spending in order to service their debts, were arguably one of the downturn’s causes. On the top of the cost of acquiring the licenses, operators will have to spend another \$400 billion or so to build their 3GT networks, so they are teaming up to share infrastructure and reduce costs. There are also fearsome technical problems to overcome. This has delayed the start of 3G services: The world’s first 3G network was launched in Japan on October 1st 2001, five months late, and 3G networks in other parts of the world were further delayed by months, even years, than originally planned.

- All this has led to scaling back of expectations. Operators are no longer talking of watching video clips on the train, or videoconferencing in a taxi; instead they are concentrating on more realistic goals, such as using phones to access e-mail, download news and weather reports, and call up location-specific information. Meanwhile, many operators have already launched so-called “2.5G” networks-upgraded 2G networks that offer some of the benefits of 3G (in particular, an “always on” data connection) but cost a lot less. This means 3G will not be a sudden miraculous transformation originally expected, but a gradual evolution from today’s systems. And the truth is that a great deal is already possible with existing mobile networks.
- Indeed, amid all the churning going on in the technology sector, an important transition is under way. Allowing for the late arrival of 3G, it will probably be 2.5G handsets that will overtake PCs to become the world’s most prevalent Internet access device. *But one way or another, phones will become more predominant means of access to the Internet.*

- Detailing further, it can be said that it would be a mistake to equate mobile Internet with 3G and assume that, because 3G is in trouble, other mobile-Internet services are too. Instead, there will be many overlapping and interconnected wireless networks. There will also be a variety of access devices, including laptops, handheld computers and other, as yet undreamed of, gizmos. Different networks and devices will be used in different situations by different kinds of users in different parts of the world. But, as mentioned earlier, it is clear that the Internet-capable phone will dominate as the mobile device of choice.
- Combining the Internet with mobile phones will pose technical, business and cultural challenges.
 - 1. There is a clear conflict of attitudes between Internet and mobile-phone users. Former user expects things to be free, and are prepared to accept a certain degree of technological imperfection. The later (i.e., mobile phone) user is accustomed to paying, but expects a far higher level of service and reliability in return. (Depending on the situation, however, there can be mixed requirements, i.e., commoditization of two types of uses. See next item.)
 - 2. But differences between the two worlds also present an opportunity. Content providers see the mobile Internet as a way to start charging for their wares. Wireless-network operators see themselves as the potential gatekeepers to the mobile Internet, and may be in a position to grab a share of online commerce revenues, which fixed-line Internet-access providers have failed to do. Hardware and software companies see all sorts of new opportunities in products to build to knit the Internet and mobile networks together.

- In short, the mobile Internet is a chance to build a new network, and to get it right this time-by learning from the mistakes made by all those failed dotcoms. The biggest gamble in business history; control of a vast new medium; the opportunity, at last, to monetise the Internet: clearly: a great deal is at stake. It is a difficult task; what gives it a hope is that in many parts of the world millions of people are even as of 2001 using phones and other handheld devices to communicate on the move and that all over the globe the foundations for the shift to more advanced services are already in place.
- **The shape of things to come is already becoming apparent, if one knows where to look.**
 - Even as of the year 2001, the future of the mobile Internet was evident in the gadgets of NTT DoCoMo, Japan’s dominant mobile operator, and unquestioned global leader in the fusion of mobile phones with the Internet.
 - DoCoMo, whose name is a play on the Japanese word for “anywhere”, has 37m subscribers covering 60% of the Japanese mobile-telephony market (2001 statistics). Over two-thirds of its its 37m subscribers have also signed up for the company’s I-mode services, which were launched in February 1999. This allows them to use special i-mode phones to send and receive e-mail, read news, access weather forecasts and horoscopes, and download ringing tones and cartoon graphics from nearly 50,000 i-mode-compatible websites. The most advanced I-mode phones double up as music players and can download and run small pieces of software, including games. Other popular uses for I-mode include mobile banking, stock trading, and reserving airline tickets (see following Table).

Year 2001 i-mode usage statistics from DoCoMo

Usage Activity	I-mode menu websites consulted, % of total	i-mode users by age group	i-mode users by age group, % of total
Ringing tone downloading	9%	- Unknown - Under 20	2% 7%
Games	11.5%	20-24	24%
Entertainment	17%	25-29	20%
Databases	8.5%	30-34	12%
Transactions	40.5%	35-39	8%
Information	13.5%	Over 39	27%

- This is impressive from a technological point of view, but what is even more remarkable is that i-mode's 27m users are prepared to pay for these services. On the top of a monthly charge of \$2.50 (300 yens – “yen” is a Japanese currency) to access the i-mode service, they pay 2 cents (2.4 yens) for every kilobyte (thousand bytes) they download. In addition, around 500 DoCoMo-approved i-mode sites are subscription-only, requiring users to pay monthly fees of up to 300 yens each; DoCoMo collects these fees as part of the monthly phone bills, takes 9% commission, and passes the rest to the site's publishers. About 50% i-mode users subscribe to one or more of these sites. And despite claims that i-mode appeals only to teenage girls, half of all I-mode users are 30 or over, and quarter are over 39 (see table).
- **Why mobile is different?**
 - Because people are prepared to pay.
- **What do customers want from the mobile Internet?**
 - It should come as no surprise if the killer application for the mobile Internet, at least for consumers, turns out to be person-to-person communication. That, after all, has been the golden prize of previous technologies, from telegraph to telephone to mobile phone.

- The Internet's killer application is e-mail, even if the web accounts for more traffic. Transmitting speech, words, pictures and graphics are all social activities, and mobile phones are primarily social devices. "Messaging is a much bigger chunk of this new market than people want to talk about," says Niklas Savander of Nokia, the world's biggest handset maker. "Perhaps they think it's boring." Certainly, it means that in the short term, the fancier possibilities of the mobile Internet are more likely to be adopted by business.
- **A different way of working: all sorts of companies are finding mobile Internet technology surprisingly useful.**
- **Wireless bunfight - who could have thought that thin air could be so competitive?**
- **A mobile future – There is much more to it than the Internet without wires.**
(Ref.: The Economist October 13, 2001)

A survey of the real-time economy (2002)

- How about now?-Information technology is increasingly taking the lags out of doing business, in effect creating a real-time economy, says Ludwig Siegele “A survey of the real-time economy” in The Economist February 2nd 2002.
- Timely technology-New kinds of software could make companies both more integrated and more flexible.
- How smart sensors can monitor the real world.
- Always-on people: A big part of running a real-time enterprise will be managing relationships - in fact *information*.
- Managing a supply-chain is becoming a bit like rocket science.
- Re-engineering in real-time: Information technology will transform the company as we know it.
- Computers of the world unite-The real-time economy is coming, but it will take time-and it will rise problems of its own.

(Ref.: The economist 2nd February 2002)

A survey of the IT industry (2003)

- Paradise lost-so far, information technology has thrived on exponentials. Now it has to get back to earth, says Ludwig Siegele.
- Modifying Moore's law-Many of the innovations that made IT industry's fortunes are rapidly becoming commodities-including the mighty transistors.
- Moving up the stack: The network is becoming the computer-and the It industry's dominant platform.
- Techniques, not technology
- At your service-Despite early failures, computing will eventually become a utility
- The fortune of the commons: For the first time, the IT industry is widely adopting open standards-thanks to the Internet.
- The IT industry's customers are demanding more bang for fewer bucks.
- Despite its libertarian ideology, the IT industry is becoming increasingly involved in the machinery of the government.
- If history is any guide, the IT industry's future will be about services and customer power.

(Re.: The Economist 10th May 2003)

E-commerce takes off (2004)

- Retailers are the top performers online.
- Within a decade, most travel bookings are likely to move online.
- Online auctions have become a runaway success.
- Why some business-to-business exchanges have been slow to take off.
- There are plenty of ways to amuse yourself online.
- Searching for profits has become highly competitive.
- The internet offers huge scope for both business and leisure, but security urgently needs to be improved. (what else?).

(Ref.: The Economist 15th May 2004)

Make it simple: A survey of information technology (The Economist October 30th 2004)

- The next thing in technology, says Andres Kluth, is not just big but truly huge: the conquest of complexity.
- To be truly successful, a complex technology needs to “disappear”.
- Companies’ computer infrastructure contain a Pandora’s boxful of trouble.
- If in doubt, farm it out: The ultimate solution to simplifying your data-center is not to have one at all.
- Spare me the details: There is a huge gap between what consumer’s want and what vendors would like to sell them.
- What is the use of all that electronic information if you can’t get at it?
- Plain old telephone systems are becoming redundant.
- Stand by for a spot of creative destruction.
- (Ref.:The Economist October 30th 2004)

A survey of consumer power (2005)

- Competition in your local supermarket is getting vicious.
- Man's best friend- A mobile phone.
- Motoring online: Buying a car will never be the same again, thank heavens.
- Target practice: Advertising used to be straightforward. Now it has to be many different things to different people.
- Buying the future: Now they have assumed power, what will consumers do with it?

(Ref.: The Economist April 2nd 2005)

The physical internet

A survey of logistics (2006)

- Shining examples: How three large and successful companies are using supply chains to compete.
 - Manufacturing complexity: As distinction between ownership and control become blurred, supply chains are getting twisted.
 - Cargo cult: With more and more stuff being moved around the globe, efficiency is at a premium.
 - Just-in-time lobsters
 - Chain reactions: Delivery companies are consolidating.
 - Delivering the goods: A courier company goes online.
 - When the chain breaks: Being too lean and mean is a dangerous thing.
- (Ref.: The Economist June 17th 2006)

MORE ON USEFULNESS OF MOBILE INTERNET TECHNOLOGY TO BUSINESS AND EMERGING DISRUPTIVE BUSINESS MODELS

- The Internetworked Business at Work
 - The upheavals of the early '90s-process reengineering, downsizing, and PC proliferation-were a tea party compared with what's coming next. As the ice age of the old economy comes to an end, cracks widen in the fault lines of crumbling business models. Intuition and creativity will blossom in organizations rooted in the fertile soil of the new media.
 - David Ticoll
 - President, Alliance for Converging Technologies
- (Ref.: Don Tapscott, *The Digital Economy*, New paradigm Learning Corporation, USA

- As the Internet boom of the early '90s turned into bust, Corporate America could be forgiven for allowing itself a small sigh of relief. When all was giddy, and the stock market giddiest of all, big companies feared the disruptive power of the Net. Look at what happened to Barnes & Noble, they fretted, as Amazon.com changed the game of bookselling. Or how Expedia Inc. overran travel agents. No one wanted to be the next to get “Amazoned.” So when the NASDAQ buckled in 2000, the corporate giants relaxed – relieved that things weren’t going to change as radically or as rapidly as they had feared.
- For all the hullabaloo over the new business models and dotcom startups, at least from above stand point, the benefits of the fixed-line Internet accrued mostly to existing firms that reinvented themselves around it, rather than new upstart firms that started from scratch – barring of course the exceptions of the first generation successful disruptive innovators, namely, Amazon, Expedia and others from books, music, and air-travel industries.
 - By adopting e-mail, intranets, extranets, customer-relationship management (CRM) and enterprise-resource planning (ERP) systems, large firms made huge investments in internet technology and further emphasized productivity and efficiency for competitive advantage.(Ref.: A survey of the mobile Internet, The Economist, October 13th 2001)

- But, alas, the threat is back. Net companies have survived their nuclear winter, and throughout the economy, big companies are again under assault. Again, the Web is threatening to force down the prices charged by traditional players, squeeze their margins, and even put some out of business. New technology, new ways of doing business, and new approaches to cutting out middlemen mean the old pricing power is collapsing in a series of industries - and existing leaders will be forced to find new ways to make money. The pressing question is: How many more industries will be transformed by the Net? “How high is the sky?” answers Barry Diller, CEO of InterActiveCorp, which owns Expedia and other Net properties.
- In the first wave of disruption, Amazon, Expedia, and others rewrote the rules for books, music, and air travel. Now the Web is poised to remake at least six more major industries: jewelry, bill payments, telecom, hotels, real estate, and software. Key questions arise: Why these industries? And why now?
 - Reason 1- Competitive advantage through supply of complex information (maximal information origination):
 - In the first round of disruption, the online players were selling commodities. Books, music, or stock trades. Customers didn’t need to see, squeeze, or sniff the stuff - all they cared about was the price. Today’s Net upstarts are pulling together more complex information and boiling it down (for flexible information decision) so consumers can become smarter purchasers of a broader array of products and services.

- Reason 2- Broadband (along with with availability of mobile devices) has been instrumental in the Net’s advance, too.
 - A critical mass of people around the world now have high-speed Net-access. That means consumers can handle the huge loads of information dished out by the second wave of disruptive, online players. Net links let them browse through dozens of photos of hotel rooms, check out on variety of gold necklaces, or take virtual tours of scores of homes for sale.
- Reason 3- Availability of speedy Net connections
 - Speedy Net connections also have made it easier for programmers around the world to cooperate in developing new open-source software, which is changing the economics of the \$200 billion software market.
- Reason 4- Incumbents have long supply chains, which the upstarts are cutting down
 - The incumbent industries under assault have other more subtle characteristics in common, as well. Several, including jewelry and hotels, have long supply chains with many middlemen, each of whom takes a cut of the profits, driving up retail prices.
 - A South African white diamond can pass through five different hands, including rough-diamond brokers, cutters, and jewelry and diamond wholesalers. Second wave Net upstart Blue Nile connects over the Internet to its key suppliers, who buy their stones directly from South Africa’s powerful DeBeers Consolidated Mines Ltd. That eliminates three middlemen or more.
 - “Businesses are learning to drive process change by combining it with technology,” says John T. Chambers, CEO of networking giant Cisco Systems Inc. (Ref.: E-Biz strikes again, Business Week, May 10,2004).
- So, who will win, the upstarts or the establishes firms (incumbents)? This time, with incumbents attuned to the advantages of the Net, there will be victors on both side. A Blue Nile (upstart from jewelry industry) here, a Verizon (incumbent from telecom industry) there. More important, though, is the point that the Internet – along with mobile telecom - will continue to to have sweeping impact on the business models and economy, giving consumers more choices and making everyone more effective, economic and efficient.
- (Ref.: E-Biz strikes again, Business Week may 10,2004)

More on usefulness of mobile internet technology to business

- For incumbent firms who made huge investments in IT, analysts argue that, in a manner of linear extension of the firms' re-engineered business processes, it is now a relatively simple step for these firms to extend their systems to reap business benefits of Internet connected to mobile devices.
- Mobile devices, says Martin Dunsby of Deolitte Consulting, enable workers on the front line to get data in the back office. "The value is not from cutting the cable," he says, "it's from process change that's enabled by the technology."
 - Example 1 of the process change
 - Consider an example of time-and-expense tracking, in which consultants enter the amount of time spent working on a particular project into a handheld device. This may not be quicker for them than filling in a paper timesheet, but it means that the data and information can be sent back to head office straight away and an invoice issued, rather than the information being being keyed into the accounting system at head office several days later.

- Example 2 of the process change
 - Similarly, when visiting a client, a salesman can use a wireless handheld device to call up the latest inventory levels, technical support histories and so on, which will have implication for salesman-customer interaction/negotiation during the sale finalization.
- Example 3
 - Business use of mobile Internet also evades the routinely encountered problem of aligning services with available hardware: a firm that wants to provide its workforce with wireless access can specify from top to bottom, from handsets to software to network provider. Existing technology, in form of 2.5G and Wi-Fi networks, is already good enough to make this possible today: there is no need to wait for 3G. And there is a growing range of handheld computers, Internet-capable phones and intermediate devices to choose from.
- Example 4 of “wireless workforce”
 - At present adoption of mobile Internet technology, which facilitates work in a mobile information environment, makes more sense for sales force in financial services, healthcare and pharmaceuticals, field workers for utilities and so on.
 - Surely most mobile workers already have laptops? Yes, but wireless handheld devices have a number of advantages. Laptops have complicated operating system software, plus a whole lot of additional software loaded on top, whereas handheld computers or phones are much simpler machines, with almost nothing to go wrong. This means support costs are lower by a factor of at least five.

- When Goldman Sachs employees were given BlackBerry e-mail pagers developed by Research in Motion, a Canadian wireless firm, their use fell by 45%. A fifth of BlackBerry users stopped using their laptops altogether.
- **Example 5: Business advantages from use of BlackBerry**
 - The BlackBerry looks like a glorified pager. It has a small keyboard and an always-on wireless data connection. Among other functions, it allows users to send and receive e-mail on the move as though they (users) are sitting in front their desktop PCs. The BlackBerry is the first of a new breed of devices positioning itself between handheld computers and mobile phones.
 - BlackBerry makes employees more responsive, because they can catch up with their e-mail on the move rather than back at the office; a BlackBerry, unlike a laptop, can be used in a taxi.

More on Emerging Disruptive Business Models

- Example 1 from Jewelry industry: Online Jewelry sales
- Example 2 from Banking industry: Online bill payment and processing, use of paper cheques headed for decline
- Example 3 from Telecom sector: Internet phone services are undercutting the telecom giants and creating new rivals
- Example 4 from Hotel industry: Online bookings are getting better rates by offering hotel volumes. That has the chains scrambling.
- Example 5 from Real Estate's industry: Speed and heft will let Net players drive down brokerage fees- and gain share.
- Example 6 from Software industry: Open-source developers are looking beyond Linux to databases, e-mail, search-even desktop PCs.

Example 1 from Jewelry industry: Online Jewelry sales

- Blue Nile packs a punch by streamlining a famously byzantine (Byzantine = Connected with Byzantium or the Eastern Roman Empire; Complicated, secret and difficult to change) business. It has just 115 full-time staffers and a 10,000 sq. ft. warehouse. To sell \$129 million worth of jewelry, a chain would need 116 stores and more than 900 workers, estimates analyst Ken Gassman of Rapport Research.
- Blue Nile also bypasses the industry's tangled supply chain, where a stone can pass through five or more middlemen before reaching a retailer. Instead, Blue Nile deals directly with major suppliers through its own network on-line.
- To get to where they are, the Net upstarts had to defy conventional wisdom that diamonds couldn't be sold online. The companies solved this problem by giving people the same information a jewelry expert would give them.
 - They dish up educational guides in plain English and independent quality ratings for every stone.

- For example, a customer at Diamond.com can pore over the rating scales for cut, clarity, and color, pick out a one-carat stone with a preferred criterion – and then shop around for a better price.
 - These resources are now standard practice, as is a 30-day guarantee. “The comfort level came from that guarantee,” says Pat Grobelny, a California college student who bought his girlfriend a Valentine’s Day ring at Ice.com.
- This commoditization of diamond selling is making it progressively harder for small jewelers to make money. Even among survivors, profits are lean, and many small fry say they are specializing in custom-crafted pieces that don’t include diamond. “Anyone with half a brain who wants a diamond engagement ring will go to the Internet,” says Roger Thompson, a small jewelry shop owner in Lambertville, N.J.

In Summary....In Jewelry industry

Hunters	Blue Nile, eBay, Amazon.com, Diamond.com
Hunted	Zale, Tiffany, neighborhood jewelry stores
At stake	A \$45 billion U.S. industry
Outlook	Only \$2 billion in jewelry sales are conducted online now, but e-tailers are coming on strong. Blue Nile boosted revenues 79% in 2003-12 times faster than the industry. Tiffany is more insulated because it sells image and cachet, Zale and neighborhood stores face trouble.

(Source: Timothy J. Mullaney, in E-Biz strikes again, Business Week, May 10, 2004)

Example 2 from Banking industry

- The sky-rocketing adoption of online bill payment are reshaping the \$30 billion business of printing, transporting, and processing cheques. Driving the transformation are banks, credit-card companies, and merchants eager to simplify an antiquated system that involves as many as 28 middlemen. They have plenty of motivation: Handling an online payment costs only 10cents, roughly one-third that of processing a paper cheque, according to Atlanta consultant Global Concepts. The result: The number of cheques written annually should decline by about one quarter by 2007, to 30 billion, estimates researcher Celent Communications LLC (Year 2004 statistics).

In Summary...In Banking industry

Hunters	Startups, including Viewpoint, Endpoint Exchange, and NetDeposit that manage archives of digital checks (cheques) and provide check exchange software and services.
Hunted	Check-printing companies such as Deluxe, check transport specialists like AirNet, and community banks.
At Stake	A \$30 billion industry that handles the printing, transporting, and processing of checks.
Outlook	The number of checks written in the U.S., in 2004 around 40 billion a year, is expected to decline 25% over the next three years.
Source: (1) Andrew Park, with Ben Elgin and Timothy J. Mullaney, in E-Biz strikes again, Business Week 10 th May 2004; (2) Tower Group, IBM Celent Communications LLC	

Example 3: In Summary...In Telecom industry

Hunters	Vonage, Net2Phone, and other upstarts
Hunted	Telecom giants from Verizon and France Telecom to AT&T and NTT
At Stake	Leadership of the \$300 billion U.S. phone market and the \$750 billion international market.
Outlook	Phone calls with Net technology, which are about 33% cheaper than regular phone service, are expected to hit \$6.7 billion in U.S. revenues in 2007, up from \$281 million in 2003. Even more significant, Net technology will make it easier and cheaper for a host of small outfits to compete with the big phone companies.
Source: (1) Steve Rosenbush, in E-Biz Strikes again, Business Week May 10,2004, (2) UBS, FCC, AT&T, Pulver.com inc, The Telecommunications Industry Association, USA	

Example 4: In Summary...In Hotel industry

Hunters	Expedia, Travelocity, Orbitz
Hunted	Chains, including Hilton Hotels, Starwood Hotels & Resorts, and InterContinental Hotels Group.
At Stake	Pricing and profits in the \$80 billion U.S. hotel biz.
Outlook	Hotel chains are trying to get Expedia to pay more for the rooms it sells. But that will be tough. Online agencies have legions of loyal customers that they can direct to the most cooperative hoteliers. By 2006, the upstarts are expected to account for 17% of the lodging market, up from 8% in 2003.
Source: (1) Timothy J. Mullaney, E-Biz Strikes again, Business Week May 10, 2004, (2) UBS, FCC, AT&T, Pulver.com inc, The Telecommunications Industry Association, USA	

Example 5: In Summary...In Real Estate industry

Hunters	Lending Tree, zipReality.
Hunted	Real estate brokerage franchises run by giants such as Cendant and RE/Max International.
At Stake	Control of \$60 billion in U.S. residential real estate commissions.
Outlook	In a highly fragmented market, upstarts like Lending Tree are projected to grab a 4% share within three years (by 2007).
Source: (1) Timothy J. Mullaney in E-Biz Strikes again, Business Week May 10,2004, (2) UBS, FCC, AT&T, Pulver.com inc, The Telecommunications Industry Association, USA	

Example 6: In Summary...In Software industry

Hunters	Red Hat, Jboss, MySQL.
Hunted	Traditional software makers, including Microsoft, BEA Systems, and Oracle.
At Stake	Profits in the \$200 billion worldwide software industry.
Outlook	Open-source packages are gaining momentum. MySQL has 5000 customers for its database software. Established software makers will be forced to lower prices and innovate to stay ahead of open-source alternatives.
Source: (1) E-Biz Strikes again, Business Week May 10,2004.	

Example 7 from Healthcare

- Following is a real case example of application of convergence technology to healthcare. The case example was carried out in real life by the National Information Infrastructure Testbed (NIIT).
- A 40-year-old woman from Baltimore, vacationing with her family and driving in the family car through the southeastern desert of California, is seriously injured in an accident. She is unconscious and unresponsive. Transported to a nearby rural hospital she arrives looking pale, with a pulse of 120 and blood pressure of 110/90. A breathing tube is inserted through her trachea, and she is placed on a ventilator.
- The emergency physician of the rural California hospital, High Desert hospital- conducts a **tele-consultation** with specialists from the University of Southern California/Los Angeles County Medical Center (USC/LAC). As a result of this consultation, the patient is immediately **transported** to USC/LAC for further evaluation and treatment. A **computer tomography** (CT) scan of the abdomen reveals a massive hemetoma of the liver with no free blood

- The patient's health Care Identification (HCI) card is **swiped** through a card reader that gives access over a national network of records. The **patient's electronic records** show two very useful facts: she had a triple bypass operation a year ago and she is allergic to certain drugs. The discovery of the preexisting condition **eliminates the need to perform surgery** on a possible ruptured aorta. The information about the drug allergy allows the physician to **prescribe a non-allergenic drug**.
- Next, the doctors at USC/LAC initiate another **tele-consultation** with the patient's personal physician located at Johns Hopkins University Medical Center in Baltimore. During the consultation both doctors **view, manipulate, and analyze three- dimensional medical images** of the patient's internal organs. **They see that** a segment of the small bowel has been ruptured. They then **compare** the previous CT scan with the new 3D reconstruction of the abdomen and **agree on** a very limited surgical **approach that avoids** the need for other invasive tests and more dangerous surgery.
- This case description demonstrates how healthcare process can be transformed into an internetworked process for effective healthcare.
- Ref.: (1) Based on the description by Leslie A. Sandberg who is the chair of the NIIT Health Care Working Group. "Reflections on Building a Transnational Telemedicine Demonstration Network," Vision Becomes Reality, The Journal of the National Information Infrastructure Testbed, January 1995, Vol.95, No.1, Washington, D.C.
(2) Don Tapscott, The Digital Economy, McGraw-Hill, Inc., USA.

Example 8: Digital Execution of Ideas

- Sherri Leopard Communications, Inc., Boulder, Colorado, is a twenty-five- person public relations agency with annual billing of \$8million. The company is in the business of creating ideas to transform the marketplace image of clients.
- In early '90s, Leopard Communications installed a network of IBM OS/2 workstations and servers.
- George Poirier, hired on contract and then named full-time MIS director, created the system Leopard needed by using Lotus notes. Lotus Notes (Level Two-The High Performance Team) allows different employees to comment on the same situation. For example, a sales rep hears about a problem from a client and updates the account information with some suggestions for a solution. Her supervisor takes the file, adds some recommendations, and with a simple double click on the screen, sends the original note and her comments into a company-wide forum along with some charts and other graphics. Over the next 24 hours, another rep, and perhaps some R&D people, add more comments. The rep adds information about a possible responsive change to the product, then sends the whole proposal on to her boss and gets approval the next day. Clients across the country immediately receive on the network news about the change.

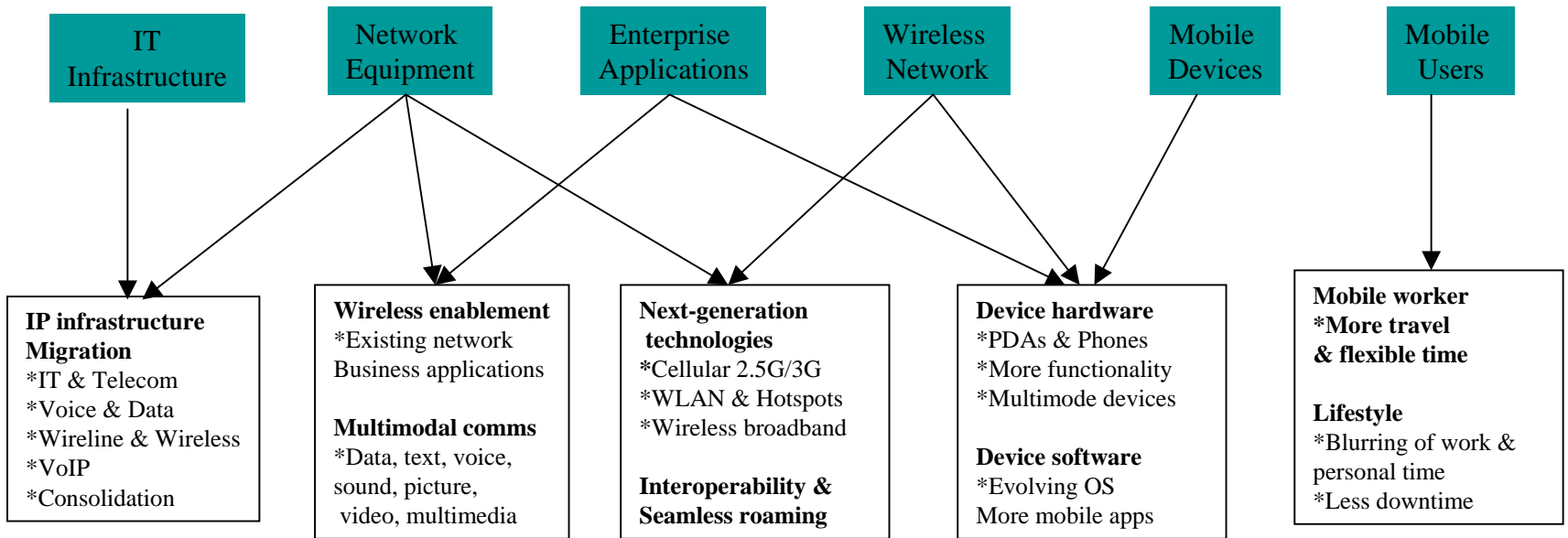
Other Examples

MOBILITY AS VALUE ADDITION IN ENTERPRISEWIDE SUPPLY CHAIN

- Facts (IDC Survey 2005):
 - Facts:
 - 1. Mobility can benefit all types of organizations by giving them instantaneity and flexibility.
 - 2. One-quarter of Asia Pacific companies spend at least 70% of their technology budgets on telecom services.
 - 3. It is not that mobile workers are a specialized group who are few and far between. Reality is that one in five of the global workforce are mobile workers.
 - 4. Normally the view is that wireless technology only delivers 'soft' benefits that cannot be quantified. Reality is that wireless technology can deliver both 'hard' and 'soft' benefits.
 - General perception is that implementation of an enterprise mobility solution typically involves re-engineering the internal processes of your business. The fact is that you can mix and match technologies to custom-create a mobile solution that matches the needs of your workforce.

- The increasing availability of high-speed wireless data networks and practical mobile devices and applications has allowed a growing number of companies to embrace mobility to improve efficiency. At this moment, mobile technology is helping:
 - Salespersons to retrieve customer data and place sales orders;
 - Field support personnel to check spare parts and access client service history;
 - Operations managers to track inventory and status of goods in transit; and
 - Business executive to make decisions while on the go.
- In short, businesses are leveraging mobile technology in all areas of operations to reduce cost, increase revenue, improve customer service and create new channels to market.
- Yet, despite the acknowledged value of mobile technology, building the right mobile strategy for sustainable competitive advantage is not an easy task. Organizations wishing to benefit from mobility must possess not only a thorough understanding of their own business, but a good grasp of mobile technologies and issues surrounding mobile solution deployment.

- Unlike wireless voice, enterprise mobility goes beyond wireless carriers and mobile handsets to include a host of other high-tech players. Since corporate applications are mobilized, IT infrastructure and business application vendors are part and parcel of the enterprise mobility spectrum, as are network equipment suppliers and systems integrators. Business consultants have also jumped on the bandwagon, bringing their business process expertise to the equation.
- Despite their differing backgrounds, these industry players are collaborating with an aim to make mobile solutions simpler for business. The rise of Internet protocol technology and convergence – merging voice and data, IT and telecom, and wireline and wireless – are also blurring the demarcations between these vendors. Major market factors driving enterprise mobility developments are summarized in the figure in the slide to follow.



Security considerations
 Strategy formulation
 Requirement design
 Information Integrity (I*I) Control
 Cost benefit Analysis
Information Economics (of Information Evaluation)

Business Information Planning for Competitive Advantage

- On Mobility Readiness so as to benefit from Mobility Value Chain
 - Companies in all industries are benefiting from mobile technology. However, IDC has found that organizations in the following verticals are at the forefront of the mobile enterprise movement:
 - Banking, insurance and financial services (including brokerage and trading houses);
 - Professional services (e.g., accountants and engineering consultants);
 - Retail and wholesale; and Government and education.
 - The notion of going mobile is not limited to large business and multinational corporations. Smaller firms with few employees are also reaping benefits. Real estate agents and graphic design companies in Australia, for instance, are equipping themselves with mobile solutions to get ahead of competition.
- Drivers and Challenges
 - IDC research shows that organizations with enterprise mobility solutions share common drivers. Regardless of their industry verticals, sizes and geographical locations, they often cite a similar set of factors that encourage them to embrace mobile technology. These factors include the need to:
 - Improve business productivity and workforce efficiency;
 - Have timely access to critical information for decision-making;
 - Cut costs; and
 - Enhance customer relationships and satisfaction.

THANK YOU