

Roadmap to Digital Transformation: Implications for Intelligence

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Today's Presentation

- The Power of the Digital Revolution
- 4 Digital Society Trends
- Two Big Questions
- Implications for Intelligence

The Power of the Digital Revolution

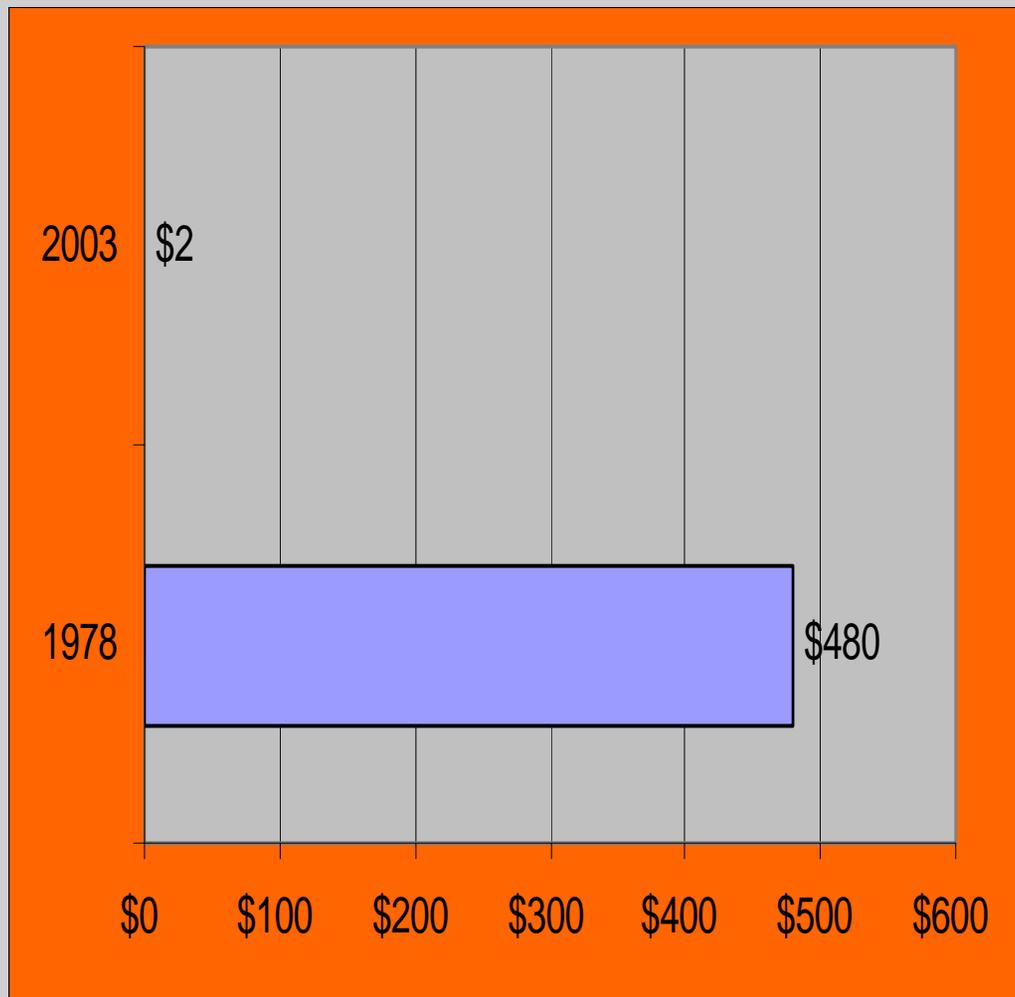
New “General Purpose Technologies” Drive Change

- Most innovations come in incremental improvements, with modest changes.
- But every half century or so a new technology system emerges that impacts virtually everything:
 - what we produce,
 - how we produce it,
 - how we organize and manage production,
 - the infrastructure needed,
 - the laws, regulations, and organization of government.
- Since the mid-1990s ICT has been the engine of change and growth.

GPT's Have 3 Main Characteristics

1. They undergo rapid price declines and performance improvements.

Moore's Law Means that Computing Power is Almost Free



(Intel processing costs in \$ per MIPS)

Microsoft's free Windows Live Hotmail email service provides 5 GB of storage for subscribers. It would cost Microsoft almost \$100 million for *each* subscriber if they used 1975 technology.

GPT's Have 3 Main Characteristics

1. They undergo rapid price declines and performance improvements.
2. They are pervasive.

Computing Used To Be Scarce



GPT's Have 3 Main Characteristics

1. They undergo rapid price declines and performance improvements.
2. They are pervasive.
3. They make it easy to invent and produce new products, processes and business models.

IT Underpins Innovation

- **Business models:** Wal-Mart's supply chain; Amazon's long tail; iTunes and the decline bricks and mortar music stores; etc.
- **Processes:** self-service; mass customization; supply-chain integration; collaborative design; etc.
- **Products/Services:** hybrid cars; transportation telematics; human genome; etc.

4 Trends

1) Everything That Can Be Digitized Will Be

- New and better applications keep coming: voice recognition, visual recognition, SOA, smart cards.
- Adoption grows: Broadband, ubiquitous computing, e-gov, e-commerce.
- More sectors adopt (e.g., health care)
- Atoms to bits: E-tickets; E-cash; E-forms; E-music, movies, books; E-banking.

Moving to an Internet of Things and an Internet of Place

- Transition from IPv4 to IPv6 will result in exponential increase in IP address space
 - IPv4 has 2^{32} IP addresses ~ 4.3 billion IP addresses
 - IPv6 has 2^{128} IP addresses ~ multiple IP addresses for every grain of sand on the planet
- IPv6 opens up the possibility of a single, global, unique identifier for every person, device and sensor
- IPv6 also has enhanced security, improved network management, and a better mobile experience
- Location services will be a next big thing (GPS enabled cell phones to grow from 153 million today to 590 million in 2011.)

2) Everyone Will be linked in a Vast Global Network



More international air travel in a day today than in a year in 1975

More international telephone calls in a day today than in a year in 1973.



More international trade in a day than in 10 days in 1968

3) Mass Customization is Replacing Mass Production



- IT enables much of the economy to be more customized:
 - Dell's "build-to-order" model.
 - Architectural Skylight Company uses CAD to automate the production of windows to architects' specifications.
 - "Pandora" lets users create their own web-radio station.

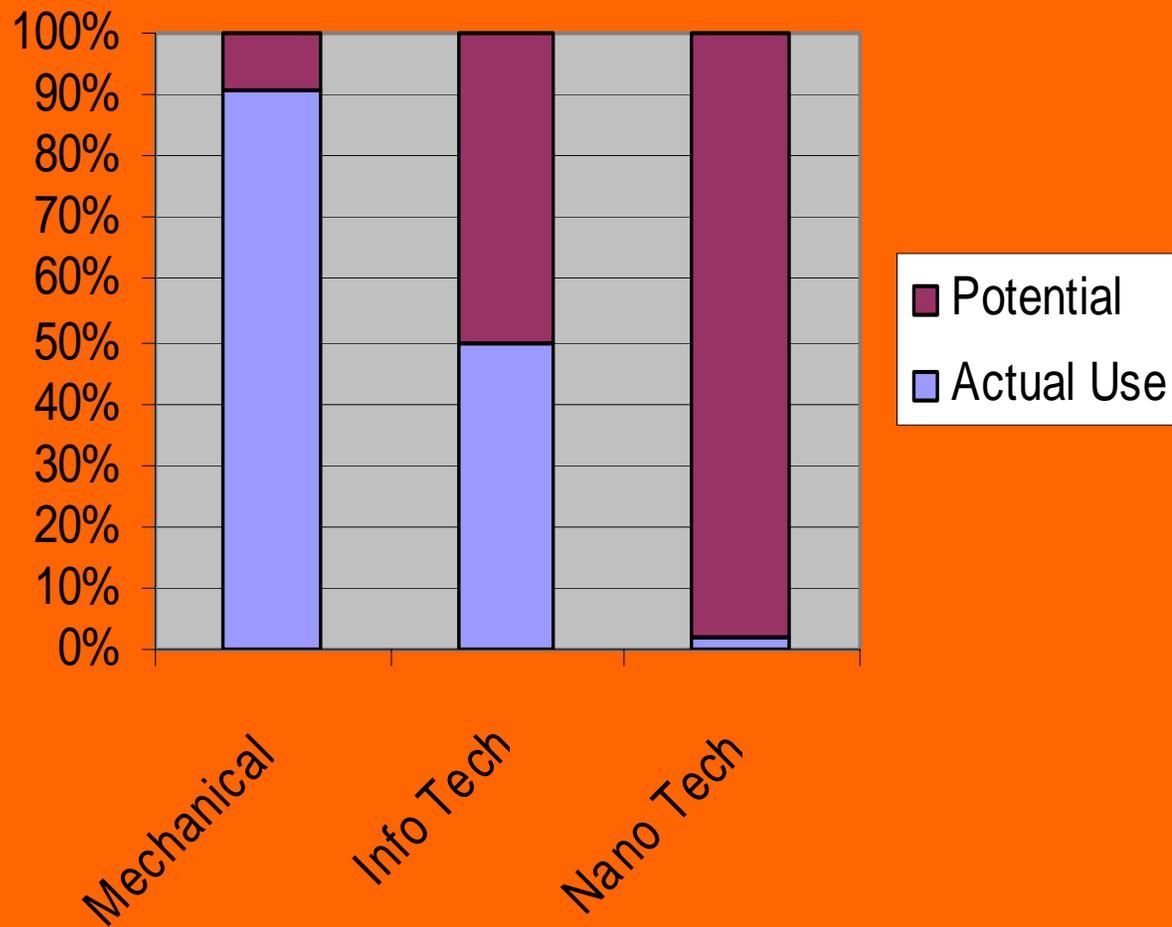
4) Innovation Is Becoming More Democratized and Collaborative

- Firms are shifting from a model in which they operated as silos separated from each other to networked firms linked to suppliers, customers, other organizations like universities, and even competitors.
- New and cheaper information and telecommunication tools (grid computing; IM; tele-presence; desktop collaboration tools) make collaboration easier.
 - IBM's Online Innovation Jam That Attracted More Than 37,000 Posts.
 - Innocentive's Online Portal In Which Problems Posed By Business Are Outsourced To The General Community For A Reward.
 - Boeing Designed Its Dreamliner In a Real Time Global Collaborative Effort.
- User-driven innovation and feedback is becoming easier and more widespread.

Two Big Questions

- When will the IT engine run out of gas?

Technology Opportunities



- Most mechanical tech opportunities are taken.
- Nano's opportunities are far in the future.
- IT opportunities are large and available now.

The IT-Engine is Not Likely to Run Out of Gas Anytime Soon

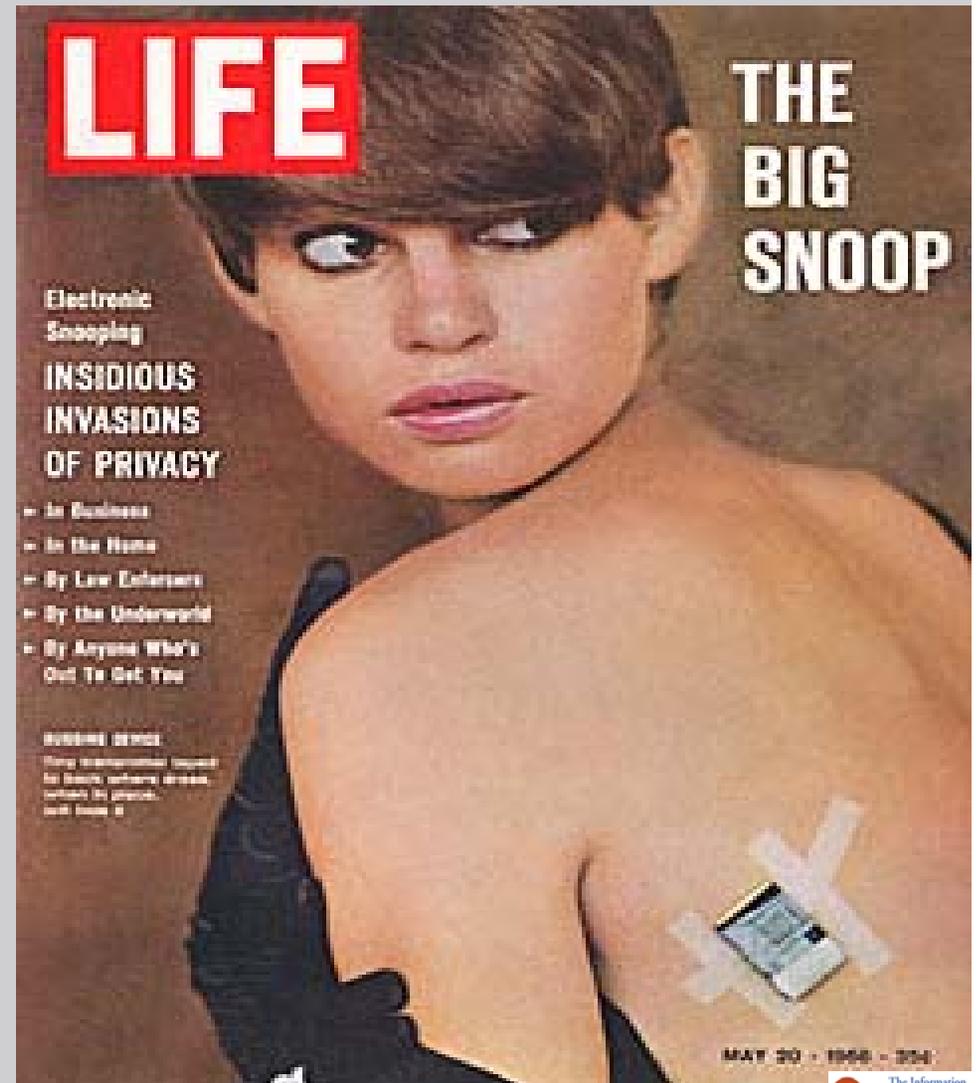
- The core technologies (memory, processors, storage, sensors, displays, and communication) continue to get better, faster, cheaper, and easier to use, enabling new applications to be introduced on a regular basis.
- Many sectors, including manufacturing have not fully tapped the potential of e-transformation.
- Application use is growing, by business and consumers and has not matured.

Two Big Questions

- When will the IT engine run out of gas?
- Will society accept a fully digital world?

Fear of New Technology is Not New

Despite the protection against invasion of privacy afforded by the fourth Amendment to the Constitution, bugging is so shockingly widespread and so increasingly insidious that no one can be certain any longer that his home is his castle - free of intrusion. (Life Magazine, May 20, 1966)



But today's its worse, because the opponents use the Net to amplify their message

- “Big Brother is monitoring us by databases” (Phyllis Schlafly, Eagle Forum)
- Why is the administration using RFID on the passport? “There is only one possible reason: The administration wants surreptitious access themselves. It wants to be able to identify people in crowds. It wants to surreptitiously pick out the Americans, and pick out the foreigners. It wants to do the very thing that it insists, despite demonstrations to the contrary, can't be done.” (Bruce Schneier)
- Only 30% of Americans morally approve of nano-tech, vs. 2/3 in Germany and France.



BIG BROTHER IS WATCHING

MOYERS: So many of these powers latent in this draft legislation were powers that were taken away from the intelligence community some years ago because they were abused.

LEWIS: That's right.

MOYERS: Do you see any protection in here against potential abuse?

LEWIS: I don't think there's very much — there's a lot more authority and power for government. There's less oversight and information about what government is doing. That's the headline and that's the theme. And the safeguards seem to be pretty minimal to me.

2.07.03
Transcript: Bill Moyers
Interviews Chuck Lewis

PUBLIC LAW 107-56—OCT. 26, 2001
This Act may be cited as the
“Uniting and Strengthening America
by Providing Appropriate Tools Required
to Intercept and Obstruct Terrorism
(USA PATRIOT ACT) Act of 2001”.

YOU

* Conduct domestic wiretapping without court order for 15 days following a congressional authorization of use of force or an attack on the United States
* Secretly detain citizens.
* Deport any alien, including green-card holders, who are convicted of drug possession or an aggravated felony.
* Access a citizen's credit reports without a subpoena.
* Abolish federal court “consent decrees” that limit police surveillance of non-criminal organizations and public events.
* Criminalize the use of encryption software in the commission or planning of a felony.
* Apply strict gag rules to those subpoenaed by a grand jury.
* Collect DNA from suspected terrorists and indeed from any individual whose DNA might assist terror investigations.
* Extend authorization periods for secret wiretaps and Internet surveillance.
* Ease restrictions on the use of secret evidence.

from: WIRED MAGAZINE, Feb. 12, 2003
“A Chilly Response to ‘Patriot II’”
(photo credit REUTERS)

JACOBSON



Implications for Intelligence

- Break down silos by relying more on “Turbo-Gov” Intelligence.



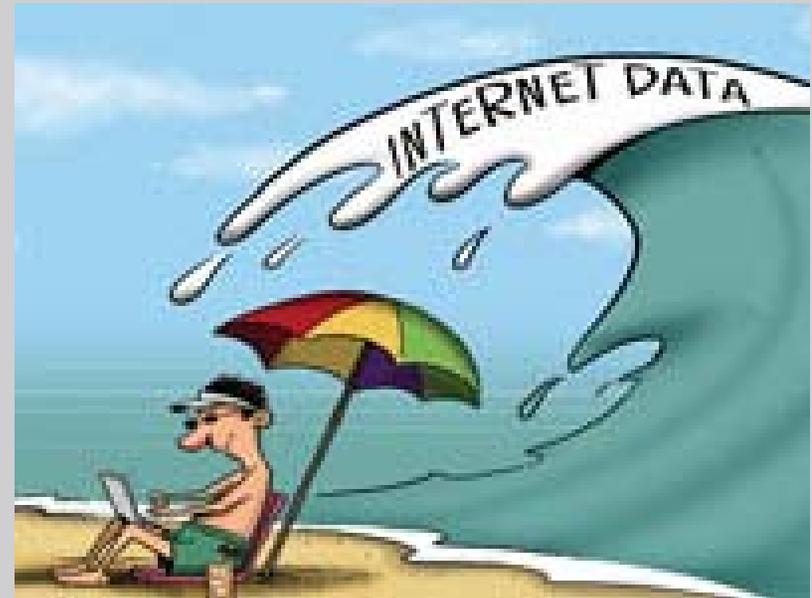
Implications for Intelligence

- Engage users more.



Implications for Intelligence

- Deal with the coming “exaflood” (based on the exabyte, which is 2^{60} bytes of data).



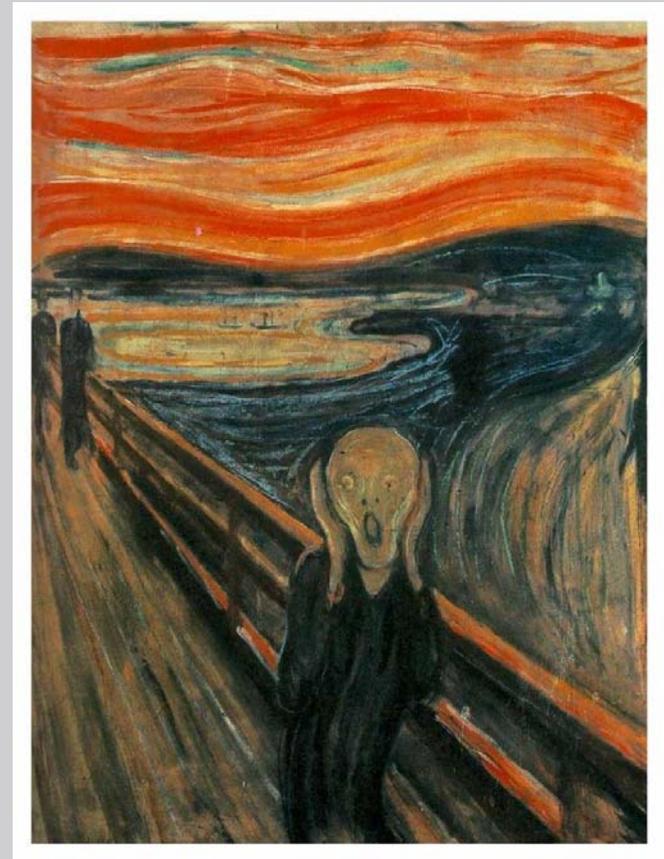
Implications for Intelligence



- Deal with a world where many things will be put online, even things that “shouldn’t” be.

Implications for Intelligence

- Take fear seriously and work to persuade the skeptics and confront the opponents.





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