PCHRI

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The Unhealthy Health Care System

- **Problem Areas**
  - Equity
  - Expense
  - Effectiveness
  - Efficiency
- Information Technology (IT) is a significant part of the answer, but can also fail

Contending Visions: Architecture is Politics

- Proprietary vs. Open
  - Standards
  - Production
- Walled Gardens vs. Interoperable Systems
- Centralized vs. Decentralized Control

Who Drives Health Care IT?

- Patient-centric, clinical care-oriented, bottom-up systems?

- Providers and payors with economic power (and necessity)?

- *Power realignment from disruptive technology?*

Key Systems Attributes Pre- and Post-disruption

- Closed -> Open
- Hierarchical, Centralized -> Decentralized, Coordinated
- Islands -> Interoperability

Fundamental Advantages of Open Systems

- More innovation

- Empowerment of participants

- If open systems are nurtured, they dominate closed alternatives

The Personal Computer as Disruptive Technology

- No one was expecting the PC
  - Widely dismissed as irrelevant to computing in the 1970's
- Represented a fundamental shift of power from elite producers to entrepreneurial outsiders
  - No permission required to build PC software applications
- Transformative innovations like the spreadsheet made the PC ubiquitous
  - …and fostered a counter-reformation

The PC Ecosystem

- ## Decentralized?
  - Yes. In formative years, a competitive market supplied large choice of software products
  - shift from vertically integrated to horizontal industry structure

- ## Interoperable?
  - To a significant degree, but more in the form of bottom-up connections than an overarching architecture

- ## Based on open standards?
  - Partially, but API's for software applications were privately controlled & exploited, e.g., by Microsoft

Lessons from the PC

- Build it and they will come
  - unanticipated entrepreneurial opportunities
- Examples
  - TOP SECRET IDEA #1
  - TOP SECRET IDEA #2

The Internet, like the PC, was an Unexpected Triumph

- We were supposed to be riding the "Information Superhighway" built by cable and telephone companies
  - Remember 500 channels?
- No one predicted ARPAnet would be the basis of the global economy
  - Or foresaw the WWW
- Collective amnesia

Internet as an Ecosystem

- Democratic design principles
  - rule of law: support the protocols
  - good citizenship: be liberal in what you can receive, but conservative in what you send
- Decentralized architecture
  - a network of networks
  - intelligence at the edges
- Emergent empowerment
  - the Internet's mantra: "Anyone can.."

Internet Information Dynamics

- The wisdom of crowds
- Disintermediation
- Open Access / Open Content
- Risks to privacy

The Power of Data

- Data is the new 'Intel Inside'" (Tim O'Reilly)
- Business leverage through data aggregation
  - Google, eBay, Amazon
- "Wisdom of Crowds" effects
- Giving patients control of their data centrally empowering to them and in aggregate

Examples of Internet Disintermediation

- Newspaper Classifieds -> Craigslist
- Travel agencies -> Priceline, Expedia
- Bookstores -> Amazon
- Broadcast network news -> Blogosphere
- Editor-controlled reference works -> Wikipedia

Impacts of Disintermediation

- Cost savings to consumers
  - free listings, cheap seats, but bad for newspaper publishers and travel agents
- Quality/Value simultaneously worse, better and different
  - "the freak show" - loss of editorial quality control in media
  - Patients able to research own conditions better via the net
  - Reduced latency
    - why aren't all reference works immediately updated like the Wikipedia?

Open Access / Open Content

- Systems with open content are fundamentally more improvable
  - Therefore quality of information will be higher over time
  - Deeply counter-intuitive
- Science articles in Wikipedia and Britannica

Risks to Privacy

- Friction reduction
  - "Liquid" info on net flows in ways paper records cannot
- Institutional problems
  - corporate incentives to exploit personal data
  - lack of accountability
- Public indifference
  - until it's too late
- Clear need for proactive legal protections
  - also, building privacy-friendly systems

Advice and Caveats

- Apply time-tested design principles
  - distribute the design work among many coordinated parties (ARPA model)
  - maintain openness with compatible IP policy (royalty-free standards)
  - never sacrifice interoperability
- Adoption strategy must be cognizant of inevitable resistance
  - The Innovator's Dilemma
  - push vs. pull adoption strategies & the consumer market