



rchn
community health foundation

New Approaches to Technology Adoption for Healthcare Organizations

David Hartzband, D.Sc.

Director of Technology Research
RCHN Community Health Foundation

Research Scholar, Engineering Systems Division
Massachusetts Institute of Technology

November 2007





Overview



The High Cost of Healthcare

- **Nearly 20% of 2007 US GDP will be spent on healthcare**
- **Within 10 years, healthcare will equal almost 50% of US GDP**
 - Equaling total \$\$ spent on all US goods & services today
- **Rate of GDP growth is unsustainable**

- **Health Information Technology (HIT)**

- Predicted as major factor for controlling healthcare costs

Electronic Health Record (EHR) adoption

- per RAND, could save \$10s of billions

Driving to efficiency

- \$100B+ in savings if HIT improves efficiency
 - As in US aerospace and automobile industries, for example

Critical Dependencies

- **The bottom line - technology acquisition is not enough**
 - Adoption
 - Implementation
 - Deployment
 - Training
 - Effective ongoing use
 - Continuous quality improvement



Successful Technology Adoption



Four Key Adoption Factors

- **Technical**
 - Systems requirements and capacity
- **Social and Cultural**
 - Workforce, training, and leadership
- **Cost**
 - Initial investment and ongoing operations
- **Alignment**
 - Functional relationship to the work flow

Adoption Barriers

- **Technical**
 - Complex systems
 - Non interoperable functionality
- **Social and Cultural**
 - Staff not adequately prepared or trained
 - Privacy and confidentiality concerns
- **Cost**
 - High initial cost with no clear ROI
 - Insufficient ongoing funding
- **Alignment**
 - Poor match to workflow and work styles

Adoption Facilitators

- **Technical**
 - Functional, interoperable systems
- **Social and Cultural**
 - Staff well trained and well prepared
 - Commitment to process improvement
- **Cost**
 - Clear ROI to support initial investment
 - Secure ongoing funding
- **Alignment**
 - Systems well matched to workflows and work styles

Breaking Barriers

- **Successful adoption requires collaboration**
 - with in the organization and with the system developers
- **Collaboration criteria**
 - Shared goals
 - Similar asset & skill availability
 - Similar reward structures
- **Practical take-away**
 - Adopting and developing organizations must work as peers



Co-Evolution: A Potential Breakthrough



Defining Co-Evolution

- **A process of iterative improvement or “evolution”**
 - Improving technology as it is being used by the organization
 - Aligning the work done in an organization with the technology
- **The “co-” speaks to mutual adaptation**
 - Technology is adapted to the organization
 - Organization adapts functional improvements driven by tech
- **An approach to more effective technology adoption**

Typical Technology Development

- **Done by software and hardware experts**
 - Not by experts in the work the technology aims to improve
- **Sometimes includes usability experts**
 - Can result in technically *usable* but not necessarily *useful* solutions
- **Some efforts to align work and tech cultures**
 - The extent to which this has been successful is debatable
- **Current dogma: users should develop their own apps**
 - Usually on and through the Web

How Does Co-Evolution Work?

- **Product is deployed into an organization**
 - Finished product - Not a Beta or test version
- **Ongoing interaction between developers and staff**
 - The staff using the product, not a management team
 - Scheduled and regular interactions are crucial
 - Ideally, dev team watches actual use of product
- **Product evolves in rapid development mode**
 - Modifications can be quickly re-deployed and tested
- **Iterations continue until mutual satisfaction achieved**
 - Or until reasonably close satisfaction achieved
- **Likely results in change for product *and* organization**

What Does it Take ?

- **Product must be highly configurable**
 - Not merely “customizable” but able to be changed rapidly
 - Code change should be a last resort
- **Collaboration period is well defined**
 - Collaboration happens while product is in actual use
 - Staff team members must be the people who do the work
- **Iterations happen as fast as possible**
 - Appropriate attention to testing and QA practices
- **Goal: configure product to align more closely with users**
 - Consistent with culture, workflows and work styles



Two Case Studies



Case Study #1: General Motors C4

- **The Assignment**

- Develop complete paperless design system with \$1.5B budget
 - Requirements, CAD/CAM, design notebook, eng-man translation, BOMs

- **The Players**

- Quasi-collaboration: GM C4 team, Digital Equipment, and IBM

- **Methodology**

- Complex system deployed to 15 internal GM groups (1999-2002)
- Dev team interacted with GM groups over about 12 months
- System modified as it was used by GM personnel
- Anthropological study guided tech development & adoption work
- Dev teams used sequential process: design/dev, review, use

Case Study #2: Small Drug Discovery Co.

- **The Assignment**

- Create automated support for early stage drug discovery
 - Integrate several existing products to create new workflow

- **The Players**

- 3 scientific teams (17 staff) & 2 developers

- **Methodology**

- Software deployed into R&D & Marketing/Sales groups
- Dev team interacted with teams over 6 months
- Multiple product iterations to produce desired integration

A Tale of Two Cases

- **General Motors C4**

- Result

- Only part of the system ever delivered
- Mosaic adoption by organization & function, parts used through 2004

- Comment

- Cultural and technical silos, and inertia, inhibited success
- Product set still judged as better fit than anything previously used

- **Drug Discovery Company**

- Result

- Produced integrated product suite with a single database & visual UI
- Closely matches workflows designed by combined team

- Comment

- Company redesigned R&D group as product and process evolved
- Still in daily use



Putting it Into Practice



Practical Suggestions

- **Look for development firms that work like this**
 - There aren't many, but there are some
- **See if current vendors will try the process**
 - Determine how closely they can/will commit
- **Understand your own work processes thoroughly**
 - You may need to actually go through and chart reality
- **Be prepared to change**
 - Both work processes & organizational structures
 - Think of each change as an opportunity for closer alignment



Summary



Presentation Summary

- **Technology solutions are more important than ever**
 - Can improve operational effectiveness & clinical outcomes
- **But full adoption is crucial for success**
 - Proper planning and integration with existing solutions
 - Staff has to be prepared, trained and supported
 - Initial and ongoing financial commitment
 - Appropriate for use by the people who do the work
- **Co-evolution is a successful development approach**
 - Helps align work processes and the people doing them
 - Technology may change work processes & organization

Final Thoughts

- **There are many ways to adopt new technology**
 - There is no right way for everyone
- **There is no magic bullet**
 - Technology adoption is HARD work
- **Evolution, of any kind, is a dynamic process**
 - It modifies its participants as it progresses

Remember

ENTROPY REQUIRES NO MAINTENANCE

Entropy: a measurement of the disorder or randomness of a system



rchn
community health foundation

Thank You

Please feel free to contact me
for more information

David Hartzband, D.Sc.

RCHN Community Health Foundation

1633 Broadway, 18th Floor

New York, New York 10019

Phone: 617-501-4611 (mobile)

Email: dhartzband@rchnfoundation.org

dhartz@mit.edu