

Control and Complexity: Reflexive Modernization

IT in the context of globalization

Control/Risk

- Traditional SE/IS methods (and management models) have control as objective
- Beniger: The Control Revolution (“=modernity”)
- Limits to control: complexity/side-effects
 - Novelty, conflicts
 - Installed base? Technology as autonomous agent
 - Globalization
 - ..
- Risk = NOT Control

Globalization and modernity

- Modernity
- From 1700 -
 - Aim: Increased control
 - Institutions (Giddens):
 - Rationalization, control systems
 - Industrial society, capitalism, ..
 - = Science and technology
 - Essence (Giddens):
 - time-space distansiation
 - development of “disembedding mechanisms”
 - symbolic tokens (money, .. (information?))
 - “expert systems” (professions, professional knowledge,..)
 - reflexive appropriation of knowledge
- Modernity = NOT Tradition

Globalization a la Ulrich Beck

- Risk Society
- Reflexivity
 - Self-reflection
 - Feed-back
- Globalization of side-effects
- Increased unpredictability, less control
- “Side-effects and non-knowledge are the main driving forces in today's' society”

The risk profile of modernity

- Globalization of risks in terms of intensity (the bomb)
- ... number of factors we are influenced by depends of global division of labour
- Risk from our constructed environment (technologization of nature)
- Institutional risk ("black Monday")

Aspects of “risk society”

- Effects of side-effects generally
- More integrated technological (socio-technical) systems => technology becomes more autonomous
- Patterns of side-effects
 - Network externalities is one form of side-effects
 - Self-reinforcing processes (adoption of standards)
 - Propagation of side-effects: domino-effects, boomerang-effects = reflexivity

General pattern

- Integration to increase control (of complex processes)
- Integration increases complexity
- = managing complexity by increasing complexity
- => less control

Cases

- Hospital: EPR
- Telecom (Mobile): Billing
- Bank: Global e-mail infrastructure
- Ship classification: In house dev. "ERP"
- Pharmaceutical: Intranet
- Computing
- Metal industry
- Chemical industry/conglomerate

Strategies

- Rationalization, modernization
- The role of IT infrastructures
- Effects: Control?
- Technology out of control? Complexities

Reflexive Integration/Standardization: Electronic Patient Records

- Aim (1995):
 - One integrated patient record
 - One integrated system
 - Norwegian standard
 - Better and safer patient treatment
- Result?

Making a standard => Killed it

- The beginning: 5 Norwegian regional (and university) hospitals + “global” vendor
- Integrating data across specialities/units and hospitals
- Integration with infrastructure (computers, OS, network, ..)
- Integrating practices within and across hospitals
- Integrated with Siemens products and strategies
- Globalized the project (Scandinavia, Europe, India, US, ..)
- Slow progress – competing products emerged
- Health care reform in Norway: Regional standards

Getting rid of paper => More paper

- After 8 years: 20-30% of info electronic
- Lots of “air” in printouts
- Electronic lab reports – up to 14 paper copies

One integrated system => More systems

- From 5 to 134 “EPR systems”
 - “One patient – one record” order creates dis-order
 - IVF: father and mother
 - Birth: Mother & child
 -
 - specialist systems (the wider the scope, the lower usability)
 - Instruments which include “EPR’s”
 - ...

Integrated patient record => More fragmentation

- More "EPR-s"
- More paper =>
 - Poorer access to paper record
 - Crises in the archive
- Crises!!
- Scanning? also added to the complexity

Patient risks?

- http://www.nrk.no/nyheter/distrikt/nrk_trondelag/1.622219
- **Krisemøte på St.Olavs**
- Datasystemet ved St Olavs Hospital er ute av drift. Alle de nye sentrene står uten både interntelefoner og datasystemer.
- Av *Elisabeth Aas* Publisert 20.06.2006 09:54
- Problemene begynte å tørne seg opp i går kveld, før systemet kollapset i løpet av natta.
- Nær halve sykehuset er uten datanett. Både øre-nese-hals-avdelingen, slagenheten og laboratorissenteret er satt ut av spill som igjen påvirker primærleger.
- Konsekvensene ved datasvikt er omfattende. Pasientlistene fungerer ikke på grunn av data-problemene, journalsystemet er nede og telefonsamtaler til og fra avdelingen er ikke mulig.

New strategy

- 2003-2004: Portal
- Also quite complex
- ?

Reflexivity: Global Bank

- System risks, “near disaster”
- Ongoing growth and integration
- Variety of e-mail systems, services, practices
- E-mail: from instant messaging to business critical archive
- One integrated e-mail system, one integrated and centralized support organization
- Integration of cultures?
- Bank Holiday Shutdown
 - The system didn’t boot: too much e-mail
 - Booting locally, restoring back-ups
 - Access rights: full rights to everybody
 - Global access to sensitive information
 - Booted after a week

Reflexivity: Mobile Phone Billing

- Australian company went bankrupt
- Rapid growth and change over many years
 - Customers, employees, services, telecom infrastructure, IT infrastructure, ISs, ..
 - Going global: expatriates
- Consultancies, outsourcing
- Communication
 - Matrix
 - More consultancies: mixture of methods, hiding info.
- Risk Management
 - Many risks .. To many: complex system in itself
 - Avoiding blame
 - “Risk Shuffling” (distribution of “bads”)

Norsk Hydro

- Established 1907
- Fertilizer
- Light metals, oil and gas
- Rapid expansion 75 - 86
- Independent national companies
- 92: Crisis - decided tight integration in Europe

Phase 1: Reengineering - no IT

- Plan: Fast integration into "One Single European Learning Organization"
- Change agents from the middle - "showed the door"
- No result
- Extremely heterogeneous IT - decided to go for SAP

2: SAP Pilot - Involving locals

- Started developing unified SAP solution
- Involving locals
- Pilot installations
- Change process started to move
- SAP - important change agent -allied with top management

3: Fragmentation - Validation/implementation

- Validated the SAP pilot - specifying additional local requirements
- Identifying and implementing shared services
- Fragmentation of SAP solution
- From unified common system to heterogeneous infrastructure
- SAP becomes allied with the locals

4: Corporate infrastructure - Future organizational change

- Integrated with other SAP solutions
- Integrated with underlying infrastructure and other applications
- No design - no plans: ***Emergent*** infrastructure
- “SAP is like concrete”
- Blocks future changes?
- SAP becomes independent master?

Hydro Bridge

- Increased focus on collaboration and learning across divisions
- Office support, e-mail, Notes, Internet/Intranet
- Heterogeneous organization -> heterogeneous systems (functions, versions, ...)
- integration
 - local infrastructure
 - other applications (SAP, SUN,)
- Standard crumbles – out of control
- SAP integration: Bad support as side-effect

The changing roles of IT

- From shared, unified system to complex, heterogeneous corporate infrastructure
- Roles (Who is in control?):
 - Blocks change
 - Helping top management
 - Helping locals
 - Independent master?

IBM

- Introducing CRM (Customer Relationship Management)
- Unified and integrated “interface” to all “products” (PC’s, big computers, support, facilities management, strategic/management consulting,...)
- 120.000 affected world wide
- Driven by top management

IBM, cont.

- Top-down, radical reengineering
- IT: Planned total redesign, later focus on a few Lotus Notes applications
- Huge problems, small (no?) effect
- Problems: Complexity and dynamics, existing IT-systems (thousands)
- Installed base (irreversible, out of control)

SKF

- Ball bearings (22.000), 1907, 43.000 employees, 20% of world market
- National subsidiaries up to app. '78
- One integrated organization
- Global SNA network
- Common systems (logistics, distribution, sales, production, ..)

SKF

- Centralized, stable, low learning, closed
- Increased collaboration with customers (Ford)
- Service oriented products (surveillance systems: motor factory, oil refinery)
- Success because:
 - Loosely coupled (un-modern)
 - isolated, stable world

Hoffman-LaRoche

- 6. largest within pharmaceuticals
- Support for “Strategic marketing”
- MEDNET
 - Design from scratch, expensive, failure, stopped

Internet/Intranet

- Separate solutions for each unit (“therapy”, country)
- Close collaboration with externals (doctors, researchers, patients, ..)
- Informal collaboration across units
- No control, plan, strategy (“financed” as SAP related)
- Success because: allied with one powerful actor, following this

Could the risks have been managed?

- Predicted?
- Would "best practise" make a difference?
 - Spiral model/prototyping?