

Human Centered Computing and Organizations

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- NCDG - 2001-present (University of Massachusetts Amherst)
- PNG - 2005-present (successor organization at Harvard)
- Build a field of study at the intersection of technology, institutions and governance
- Research – multi-disciplinary, link social, information and computer scientists
- Infrastructure -- Build global research capacity through partnerships, networks and knowledge sharing
- Advance practice
- Strengthen the network of researchers and practitioners

NCDG Political Development Research Projects

- **Sustainable interorganizational relationships and structuration:**
- 25 Presidential Management Initiative cross-agency projects
 - Continuation and expansion of BVS research program
 - Survey of federal civil servants working on cross-agency projects
 - Interviews
 - Archival analysis of legislation, testimony, budgets, etc
- **U.S. Japan comparative research:** compare development of institutional, legal and political e-govt developments. (H. Shiroyama and H. Okumura, Univ of Tokyo)
- **Technology Enactment in North America (U.S., Canada, Mexico):** replication of data collection and analysis to analyze IT in international trade processing (R. Gil Garcia and L. Luna-Reyes, Universidad de las Americas, Mexico; Amanda Coe, Govt. of Canada)

NCDG Outreach

- **Colloquium series:** 10+ speakers.
- **Trans-Atlantic videoconferenced events:** ETH Zurich
- **Blog:** on complexity and social networks.
- **Fellows Program:** 10 fellows (the Netherlands, Korea, China)
- **Translations of Research Findings:** Portuguese, Japanese and Chinese translations and publication of BVS
- **EUROPA: International keynote address** to the FP7-eGovernment Research Stakeholder Consultation Workshop, Brussels (webcast)
- **KMAP: International keynote address** to Knowledge Management Asia Pacific 2005, New Zealand
- **NETGOV:** Only U.S. invitee to EC planning session, Gabriel Lippman National Research Center, Luxembourg

Three Foci for Discussion

- How can an organizational perspective improve the design, development and deployment of cyberinfrastructure (CI)?
- How can CI facilitate productive and effective organizations?
- Are there new research opportunities which advance both SBE and CISE agendas in this area?

Organizational Form and Structure

- Explain/design organizations:
 - Widely distributed geographically and temporally
 - Share scarce, expensive, dynamic cutting edge resources
 - Dynamic and developing
 - Adhocracy and routinization
 - Cross-institutional, cross-disciplinary
 - Enable small/medium/large efforts
- **Develop research that helps us understand how to design, govern, manage CI-based organizations well**

Adaptability and maturation

- Where is a particular CI in terms of the maturity model – from ad hoc to optimizing regularized, standardized processes and practices. Different parts of the CI organization may be in different levels of maturity.
- Learning, adaptability, evolution, maturity – what are the most promising models and approaches for understanding and influencing development and adaptation of CI?

Explain and predict organizational processes

- Describe and measure variation in the attributes and goals of CI organizations.
- Researchers should assume that participants in CI-enabled organizations use a range of modalities in complementary and idiosyncratic fashion. Modalities for communication, work, and decision making include face-to-face, voice and a range of virtual modes, and combinations of these.

Some of the challenges include:

- Governance (coordination and control) processes – decisionmaking, conflict and dispute resolution, planning, resource allocation.
- Forms and processes -- Locate, examine, disseminate radically different forms and processes of “governance” in virtual organizations and other new types of organizational forms.
- Invisible, nonintrusive sources of coherence and control: embedded in systems design and internalized norms, values, beliefs, practices in members of communities of practice.

Recommendation 1

- **Research about CI organizations**
 - **Need a range of investigations (ethnographic studies, formal studies, historical, sociological, etc.) from “thick” descriptions to simulations and models of complex organizations focusing on**
 - How to study, support, and sustain of organizations of CI
 - What organizational frameworks and processes there are for the design, implementation, upgrading of CI,
 - Organizations, communities, societies supported, enabled and created from CI

CI as Communities of Communities of Practice

- Communities of practice are examples of **horizontal organization** where control is in the ethos, in professionalization, in shared understanding, shared meaning, shared language and professional practices.
- We need to examine CI that requires organization across communities of practice

Recommendation 2

- **Development of CI-savvy human capital**
 - Programs/mechanisms/activities to attract, educate, retain human resources to advance cyberinfrastructure
 - Expand knowledge of organizational and social science issues in cyberinfrastructure (service, implementation models, etc.)
 - Need predoctoral, postdoctoral, fellowship, professional programs in organization and cyberinfrastructure

Recommendation 3

- **CI tools and data management support for enabling social science research**
 - Need to better support, archive, preserve, manage social sciences databases and data collections
 - Need improved tools for observation, data analysis, mining, interoperability of data bases, data integration, privacy, confidentiality of data, etc.

Recommendation 4

- **Community-building**

- **Need a pro-active strategy and explicit formal support mechanisms for building an interdisciplinary, cross-sector community of practice**

- How to develop a Cyberinfrastructure community involving multiple projects/constituencies?

- NSF Cyberinfrastructure PI meeting each year?
- “PACI Center” Cyberinfrastructure All Hands Meeting?
- New society? New journal? Blogs? Wikis? New annual “Cyberinfrastructure and Society” conference?
- Targeted conferences on “Cyberinfrastructure for X” where X = community response, health, safety, etc.
- Involve students, postdocs, users, providers, and stakeholders in the discussion from the beginning

Technology Enactment

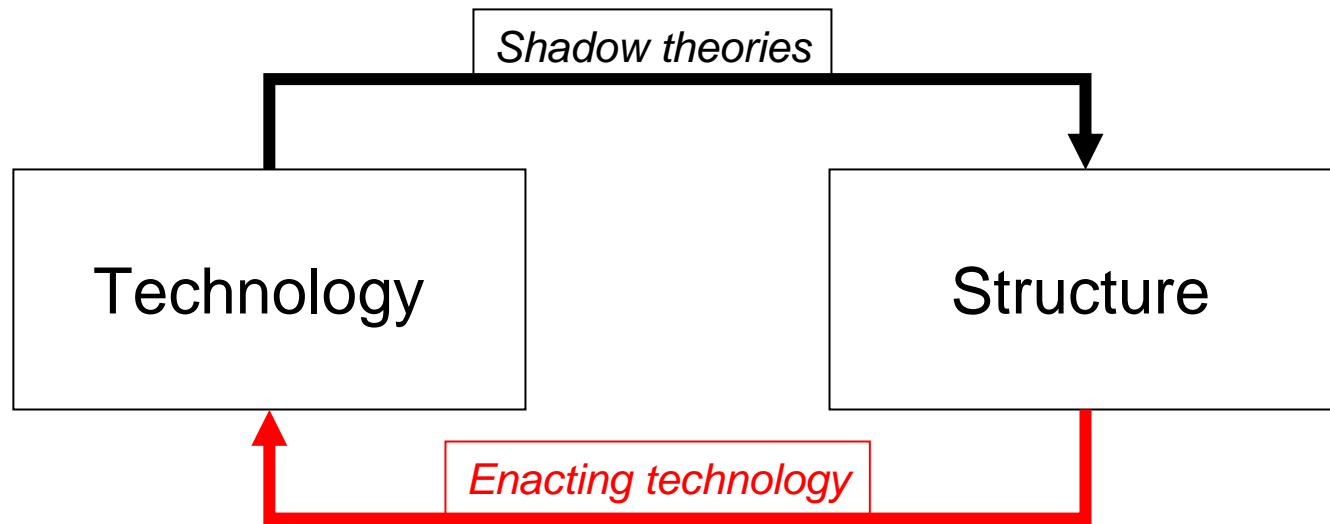
The process of enacting technology

“...refers to the tendency...to implement new information technology in ways that reproduce, indeed strengthen, institutionalized socio-structural mechanisms even when such enactments lead to seemingly irrational and ostensibly sub-optimal use of technology ”

Institutional Arrangements

- Micro-level:
 - Cognitive: procedures, habits, etc.
 - Cultural: “toolkit” of symbols, rituals, narratives
- Macro-level:
 - Structural: organizational systems, interorganizational networks, industries, sectors
 - Government: regulatory, legal and political environment (rules)
- Emphasis on rules and structure as constraint
- MIIS model in Lazer and Mayer-Schoenberg, *Information Government*, MIT Press, 2006

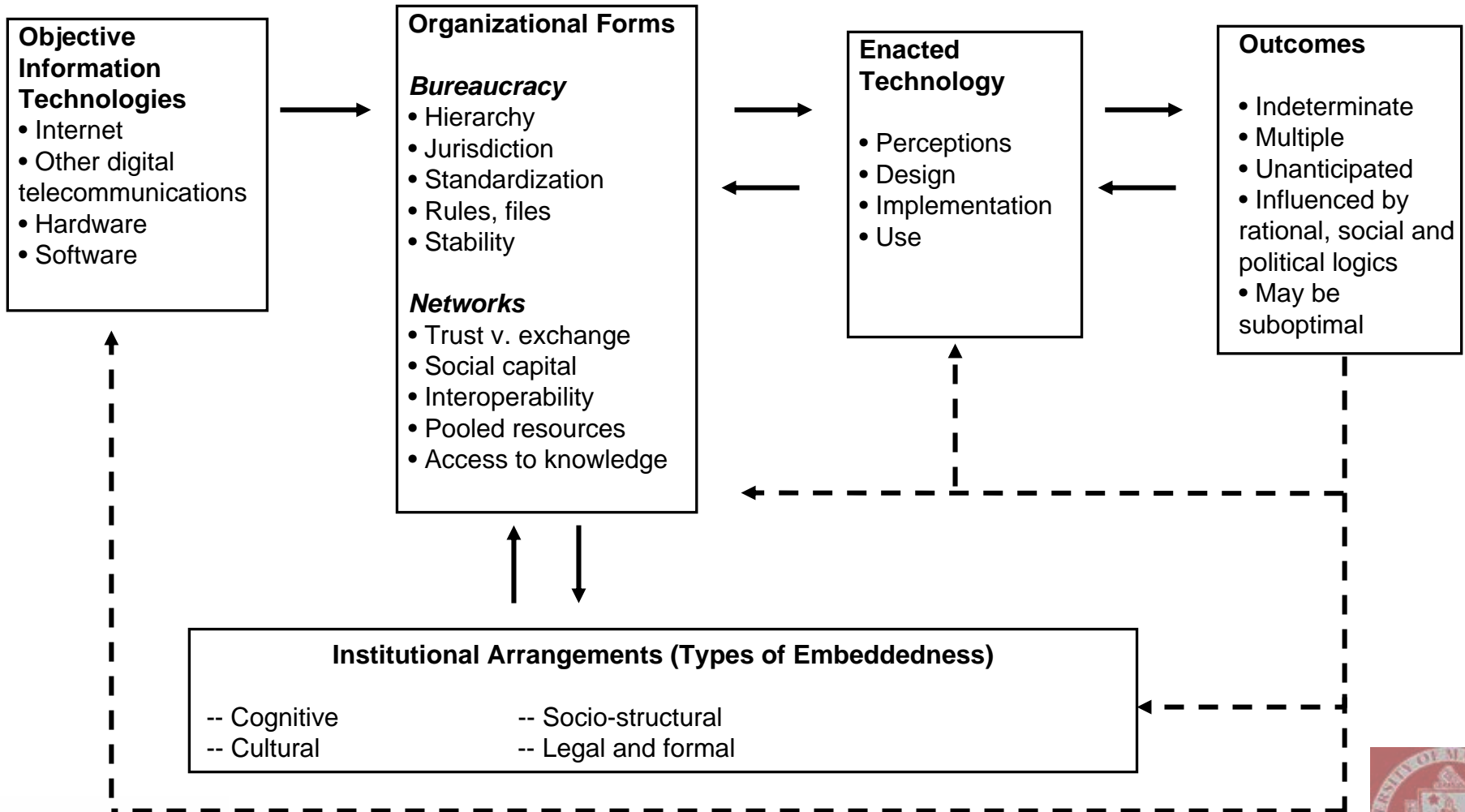
Enacting Technology



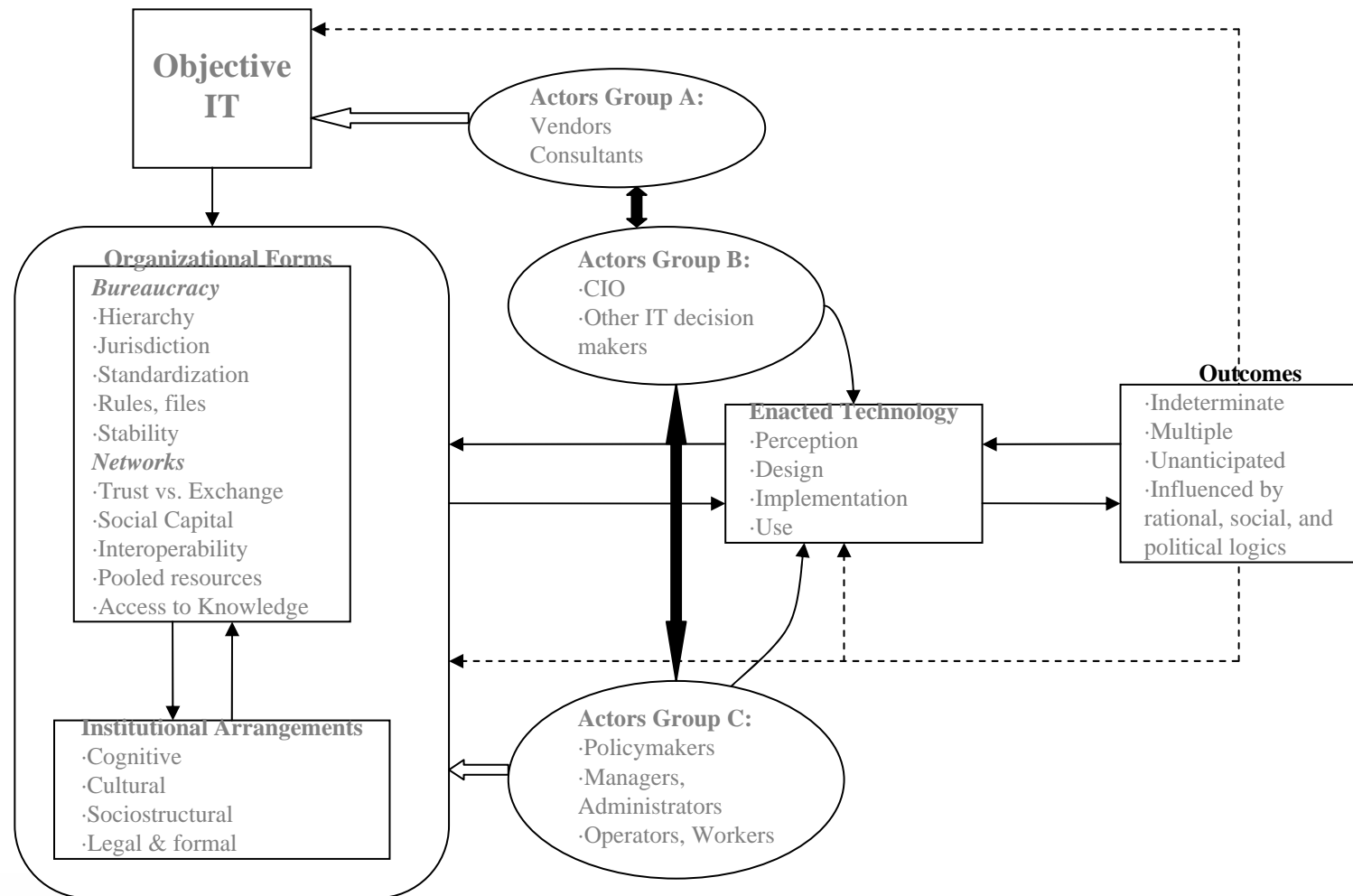
Enactment examines reciprocal effects including “the ways that organizational, political, and social mechanisms...influence the adoption, design and use of ICTs.” (Fountain, 2001).

Technology Enactment

(Fountain, *Building the Virtual State: Information Technology and Institutional Change*, Brookings, 2001, ch. 6)



Technology Enactment Framework with key actors (Fountain and Okumura)



| Projects / Departments | DoC | DoD | DoE | DoEd | DoI | DoJ | DoL | DoT | EP | FDIC | FEMA | GSA | HHS | HUD | NARA | NASA | NRC | NSF | OP | SBA | Smithsonian | SSA | Statte | Treasury | USAID | USDA | VA |
|--------------------------------|-----|-----|-----|------|-----|-----|-----|-----|----|------|------|-----|-----|-----|------|------|-----|-----|----|-----|-------------|-----|--------|----------|-------|------|----|
| Consolidated H'lth Informatics | | X | | | | | | | | | | | X | | | | | | | | | | | | | | X |
| Disaster Management | X | X | | | X | X | | X | | | X | X | X | X | | | X | | | X | | X | | | | X | |
| E-Authentication | X | X | | X | | X | | X | X | | | X | X | | | X | | | | X | | X | | X | | X | X |
| Grants.gov | X | X | X | X | X | X | X | X | X | | X | | X | X | | X | | X | | X | | | | | X | X | X |
| E-Payroll | | X | X | | | | | | | | | | | | | | | | X | | | X | | X | | | |
| E-Training | | X | | | | X | X | | | | | X | | | | | | | X | | | X | | | | | |
| E-Travel | | X | | | | | X | | | | | X | | | | | | X | | | | | | X | | | X |
| E-Vital | | X | | X | | X | X | | | | | | X | | | | | | X | | | X | | X | | X | X |
| E-Records Management | | X | X | | X | | X | X | | | | | | | X | | | | | | | | | X | | X | |
| GovBenefits.gov | | | X | X | | X | | | | | X | | X | X | | | | | | | | X | X | | X | X | |
| Expanding Electr. Tax Products | | | | | | | | | | | | | | | | | | | | | | X | | X | | | |
| IRS Free File | | | | | | | | | | | | | | | | | | | | | | | | X | | | |
| Federal Asset Sales | | X | | X | | | | | | X | | X | | X | | | | | | X | | | | X | | | X |
| Geospatial One-Stop | X | X | X | | X | | | X | X | | X | | X | X | | X | X | | X | | | | | | X | | |
| Integrated Acquisition Env. | X | X | | | X | | | X | | | | X | | | | X | | | | X | | | | | X | X | |
| Enterprise HR Integration | | X | | | | | | | | | | | | | | | | | X | | | | X | X | | X | |
| E-Clearance | X | X | X | | | X | | | | | | | | | | | X | | X | | | | X | X | | X | |
| Int'l Trade Proc. Streamlining | X | | | | | X | | | | | | | | | | | | | | X | | | X | X | X | X | |
| Business Gateway | X | | | | | X | X | X | | | | | | | | | | | | X | | | X | | | | |
| E-Loans | | | | X | | | | | | | X | | X | X | | | | | | X | | | | | | X | X |
| E-Rulemaking | | | | | | X | X | X | | | | | | | | | | | | | | X | X | | X | X | |
| Recreation One-Stop | X | X | | | X | | | X | | | | | | | | | | | | | X | X | | X | X | X | |
| Recruitment One-Stop | X | X | | | X | | X | X | X | | | | | X | | X | | | X | | | | | | | X | |
| USA Services | | | | | | X | | | | | X | X | X | | | | | | | X | | X | | | | X | X |
| SAFECOM | X | X | | | X | X | | X | | | X | | X | | | | | | | | | | | X | | X | |

Thank you!

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