Robotics in Households and Health Care

Prospects and Limitation from the Perspective of the Users

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PART I

Concepts and basic approaches

Innovation: Starting Point

- **Fate of innovation depends on:**
  - Observed regularities and trends,
    - Natural
    - Technological
    - Social
  - Human decisions
    - Individual (inventor, innovator, developer, user)
    - Collective (industry, regulators, consumers, etc.)
  - Random events (noise)

Innovation Theory: Evolution

- Observed regularities and trends
  - *Classic Innovation Theory*
    - Technology Pull
    - Demand Push
- Human decisions (innovation network)
  - *Constructive Innovation Theory*
    - Game Theory (Interest driven)
    - Network Theory (Communication driven)
- Human decisions (civil society)
  - *Participatory Innovation Theory*
    - Expanded network (systems) theory
    - Discourse theory

PART II

Application to Robotics

Three Domains of Technology

- ***Household and Leisure Technology***
  - *Allocation:* Market
  - *Test for acceptance*: purchase (personal preferences)
  - *Areas of conflict:* Liability, quality, external effects
- ***Technology at Work***
  - *Allocation:* Company decision making
  - *Test for acceptance:* Active utilization
  - *Areas of conflict:* Rationalization, Stress, co-determination

Three Domains of Technology

- ***External Technology (neighbor)***
  Allocation: Interface of economy, politics and civil society
  - *Test for acceptance_*
    - conventional: legal provisions, licensing, voting
    - unconventional: protest, political mobilization
  - *Areas of conflict:* Equity, legitimacy, vision of the future
  - *Major conflict areas:* Nuclear energy, genetic engineering, nanotechnology, robotics????

Application to Robotics

- ***Household and Leisure Technology***
  - *Allocation:* Market (Germany little; Japan more supply)
  - *Test for acceptance*: purchase (Germany: unpersonal; Japan personal)
  - *Areas of conflict:* Germany: substitute for human services; japan: Supplement to human services
- ***Technology at Work***
  - *Allocation:* Germany: co-determination; japan: management decision
  - *Test for acceptance:* Productivity (both similar)
  - *Areas of conflict:* Rationalization (Germany and Japan)

Application to Robotics

- ***External Technology (neighbor)***
  - *Allocation:* Interface of economy, politics and civil society (Japan: positive push by all three players; Germany: push by economic actors, indifference by political actors and skepticism by civil society)
  - *Test for acceptance_*
    - conventional: legal provisions (Japan: no major obstacle, Germany: problem of liability, US even more so)
    - unconventional: little social mobilization in both countries
    - *Areas of conflict:* Germany (framing as subotpimal methods to replace humans); Japan (framing as enhancement of human capacity)

PART III

Empirical Results

Dominant Images of Technology

- Technology as a major element of international competitiveness and engine for economic development *(Innovation Potential);*
- Technology as a major element of personal satisfaction and comfort (*welfare potential)*
- Technology as an expression of alienation and distance from human values (*potential for mental dissociation*)
- Technology as a cause of environmental problems (*potential for unsustainable practices)*

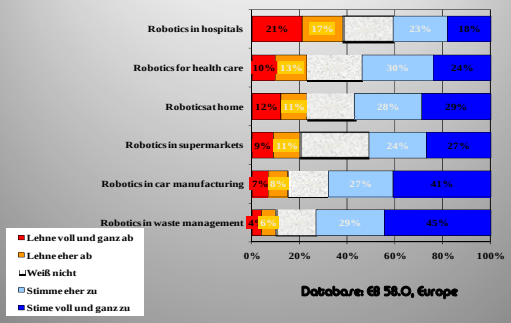
Unease with Modernization

- Technology = Manipulation of nature and de-personalization of human interaction
- Colonization of lifeworld
  - Functionalizing of human contacts and interactions
  - Dominance of economic rationality
  - Loss of personal control and agency
- Lack of trust in economic and technological elites
  - Self-interest of scientific and technological developers
  - Dominance of profitability over ethical concerns

Internal Contradictions and Inconsistencies

- Deep belief that all human wants can be accomplished by the right choice of technology (lack of perception of necessary ambivalence)
- Lack of trust in technological elites (driven by profit)
- Little confidence in regulatory power of the state or its agencies
- Belief that technology is ubiquitous and needs to be restrained
- Skepticism with respect to technological promises

Public perception of Robotis in Germany



PART IV

Conclusions

Conclusions

- Attitudes towards technology need to be related
  - To household and leisure technologies
  - To technologies at work
  - To external technologies
- Main differences between Germany and Japan
  - Robotics perceived as substitutes in Germany and as enhancement in Japan
  - Skepticism towards technological promises in Germany versus basic confidence in Japan
  - Dissent of major actors in Germany, little controversy among major actors in Japan