New Technologies as Social Experiments

Conditions for Morally Responsible Experimentation

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Existing approach: risk

Determine risks of a new technology
Decide whether these are acceptable

Risk = probability*effect

Uncertainty

Ignorance

Uncertainty

- Dealing with uncertainty is hard
- Fallacies

Appeal to ignorance

- We have not been able to scientifically prove hat there is a risk
- So there is no risk
- Has proven painfully wrong (e.g. Groningen)

Zero risk

- A technology is only safe and acceptable if we can show that there are no risks
- It is scientifically (nearly) impossible to show that there are no risks
- Zero risk is impossible (and undesirable)

Current debate

Proponents: Risk analyses show that risks are limited and 'acceptable'

Opponents: but they do not show that some hazards are impossible (precautionary principle)

Debate will not be decided by more scientific knowledge!

Current ‘paradigm’

- Risk rather than uncertainty
- One-off decisions

- But:
- Some social effects only become clear after a technology has been introduced into society

[W]e are in an unavoidably experimental state. Yet this is usually deleted from public view and public negotiation. If citizens are routinely being enrolled without negotiation as experimental subjects, in experiments which are not called by name, then some serious ethical and social issues would have to be addressed.

(EU expert group on science and governance 2007)

Implications of experimental approach

- Risks will only become incrementally clear and known
- Need for continuous and on-going decisions and adaptations
  - Not: decide to do it or not after MER and pilot
- Debate should be on:
  - Under what conditions do we want to continue experimenting with this technology?
  - Rather than: is this technology now acceptable and safe?

Responsible experimentation

- Sit together with stakeholders and see whether there is agreement under which conditions it is acceptable to continue the experiment
  - Monitoring
  - Stopping rules
- NB Decisions may impact future generations: should be taken into account

Ethical principles for research involving humans

- Non-maleficence
  - No harm
- Beneficence
  - Do good
- Respect for persons
  - Informed consent
- Justice
  - Just distribution of benefits and harms

Non-maleficence

- Absence of other reasonable means for gaining knowledge about risks
- Monitoring
- Possibility and willingness to adapt or stop the experiment
- Containment of risks as far as reasonably possible
- Consciously scaling up to avoid large-scale harm and to improve learning
- Flexible set-up of the experiment and avoidance of lock-in of the technology
- Avoid experiments that undermine resilience

Beneficence

- Reasonable to expect social benefits from the experiment
- Clear distribution of responsibilities for setting up, carrying out, monitoring, evaluating, adapting, and stopping of the experiment

Respect for persons

- Experimental subjects are informed
- The experiment is approved by democratically legitimized bodies
- Experimental subjects can influence the setting up, carrying out, monitoring, evaluating, adapting, and stopping of the experiment
- Experimental subjects can withdraw from the experiment

Justice

- Vulnerable experimental subjects are either not subject to the experiment or are additionally protected or particularly profit from the experimental technology (or a combination)
- A fair distribution of potential hazards and benefits
- Reversibility of harm or, if impossible, compensation of harm

Main or problematic conditions for this case

- Monitoring
- Reversibility
- Respect for persons (informed consent)
- Justice

Monitoring

- Importance of vigilance
  - Requires independent monitoring
  - Party that does monitoring should not have economic interest in success of technology (or experiment)
  - Seems not guaranteed in this case
  - Possible role for SodM or for MER committee

Monitoring

- On different time scales
  1. Injection of waste into caverns: e.g. possible leakage
  2. First decade, for example leakage to ground water
  3. Long-term

- Possibilities for monitoring
  1. Seems to be taken care of
  2. Requires long-term pilot, important not to scale up too soon
  3. Requires continuous monitoring (not yet foreseen)
     - Even then: we may find out about some effects too late

Reversibility

Three types of reversibility are important:

- Retrievability of waste: also because of potential economic value of e.g. heavy metals
  - Currently not met
- Reversibility of harm
  - Hazardous waste may cause irreversible harm
  - It is questionable wither hazardous waste should be used to stabilize the caverns!
- Reversibility of solution (avoid lock-in)
  - Make sure that other options stay open, also in the future!

Respect for persons

- Informed consent in this case hard to achieve due to:
  - Effect on future generations: cannot be asked for their informed consent
  - National government decides about the underground; population has limited choice
- What would at least be needed:
  - Local population should have a say; so not only information, also not only political decision (e.g. by city council), but also ‚listen to local inhabitants and give them a say

Justice

- Benefits and risks seem not justly distributed now:
  - Party that has (financial) benefits does not run the risks; while local population run risks but does not obviously benefit now
  - Some benefits are taken now while future generations face risks
- Better distribution of risks and benefits is required
  - Compensation fund for harm may be one possibility (to be paid out of revenues from waste storage)

Some tentative conclusions

- Using waste to stabilize caverns does not seem best solution
  - Introduces irreversible harm, while
  - Inherently safer alternatives for stabilization are possible
  - There is still time to deal with collapsing of caverns

- Monitoring is required but:
  - Independent monitoring and review currently not guaranteed
  - Monitoring is required also in the long-term and cautious scaling-up is required; seems currently not guaranteed
  - If hazardous waste is used, monitoring may not be able to avoid harm

Tentative conclusions (cont.)

- Reversibility is problematic
  - Better not to use hazardous waste
  - If it used: better to make it retrievable
  - At least avoid lock-in into one solution
- Respect for persons needs to be improved:
  - Make sure that local population has really a say, not just democratic decision by national or local government
  - Try to minimize harm for future generations that do not have a say
- Justice is not guaranteed: need for compensation fund to pay future harm