Malsch
Techno
Valuation

ObservatoryNANO

Individual and collective responsibility for nanotechnology

ObservatoryNano symposium

Düsseldorf, 10 -11/03/09

Ineke Malsch, Malsch TechnoValuation &
Kristian Hvidtfelt-Nielsen, Ethics Centre
Aarhus University

Malsch

Techno

Valuation

ObservatoryNANO

Table of contents

Malsch Techno Valuation

ObservatoryNANO

Who am I?

Ineke Malsch, director of Malsch TechnoValuation:
Advice on technology and society, including:

- **EU projects including ObservatoryNano, EthicSchool, ICPC-NanoNet**
- **Technology Assessment of nanotechnology.**
- **Publications on nano-, bio-, microsystems technology, etc.**
- **Located in Utrecht, The Netherlands since 1999. www.malsch.demon.nl**

C.V:

- **Graduated in Physics, University of Utrecht, 1991**
- **Postgrad. Education in Environmental Impact Assessment, and Social Studies of Science and Technology**
- **Scholarship STOA, European Parliament, Luxemburg, 1995-1996 (o.a. nano)**
- **Fellowship nanotechnology IPTS, JRC, EC, Sevilla, 1996-1998**
- **Part time study Theology, KTU, Utrecht, 2004-2005 (stopped)**
- **External PhD project Centre for Ethics, RU Nijmegen, since 2005 (prof. J-P Wils)**

Malsch

Techno

Valuation

ObservatoryNANO

1. Introduction:

ObservatoryNano activities on nanoethics and society, topics:

- **Individual and collective responsibility for nanotechnology (year 1);**
- **Nanobio(medical) ethics (year 2);**
- **ICT, privacy and security (year 3);**
- **Communication (year 4).**

Malsch

Techno

Valuation

ObservatoryNANO

2. The concept of responsibility in ethics and social studies of science

Why this survey of philosophical and social science literature?

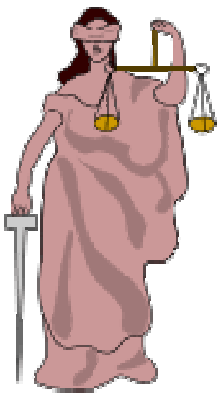
- **"Responsible nanotechnology development" is an aim of European Union and government policies and is mentioned a lot by stakeholders;**
- **Responsibility is clearly a moral concept, but what does it mean?**
- **Exploring the discussion among experts may enlighten policy making and stakeholder dialogue.**

Malsch
Techno
Valuation

ObservatoryNANO

2.1 Philosophical debate about responsibility

- **Responsibility is a concept used to evaluate actions attributed to actors,**
- **with distinct roles for actors and observers**



Malsch Techno Valuation

ObservatoryNANO

Portrait Hans Jonas, © Wikimedia, http://nl.wikipedia.org/wiki/Bestand:Hans_Jonas_portrait.png

Philosophical debate about responsibility in technological choices started around 1979 (Jonas):

- **Progress in S&T has given humankind power to damage biosphere;**
- **Need for new collective imperative of responsibility for permanence of genuine human life;**
- **Not only individual responsibility (Kant).**
- **Need for foresight and future scenarios, weighing negative scenarios heavier than positive in policy making.**
- **Criticized for introducing "Heuristics of Fear" (Grunwald).**

Malsch
Techno
Valuation

ObservatoryNANO

Philosophical discussion on concepts of responsibility:

- **Moral responsibility:**
  - **action worthy of praise or blame,**
  - **accountable moral actor**
- **Role responsibility:**
  - **Can responsibility be ascribed to individuals in corporate organizations?**
  - **Conflicting role responsibilities in one individual**
- **Collective responsibility:**
  - **organizations**
  - **social groups**
- **Co-responsibility (Mitcham, 2003, von Schomberg, 2007)**
  - **Distributed and process-oriented**
  - **Extension of role responsibility for technological innovations and risk assessment**
  - **4 characteristics:**
    - **Public debate,**
    - **Technology assessment,**
    - **Constitutional change and**
    - **Foresight and knowledge assessment.**

Malsch

Techno

Valuation

ObservatoryNANO

2.2 Precaution:

- **"Where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation" (UNEP, 1992)**

- **"The precautionary principle is widely applicable to specific cases where:**
  - **scientific evidence is insufficient, inconclusive or uncertain,**
  - **and where a preliminary scientific evaluation shows that potentially dangerous effects for the environment and human, animal or plant health can reasonably be feared"**
  - **(European Commission 2000).**

Malsch Techno Valuation

ObservatoryNANO

Criteria for applying precautionary principle:

- ***Proportional*** **to the chosen level of protection,**
- ***Non-discriminatory*** **in their application,**
- ***Consistent*** **with similar measures already taken,**
- ***Based on an examination of the potential benefits and costs*** **of action or lack of action (including, where appropriate and feasible, an economic cost/benefit analysis,**
- ***Subject to review,*** **in the light of new scientific data, and**
- ***Capable of assigning responsibility for producing the scientific evidence*** **necessary for a more comprehensive risk assessment. (European Commission 2000).**

Malsch Techno Valuation

ObservatoryNANO

Different stakeholders use weaker or stronger forms of the precautionary principle.

Experts vary in their views on usefulness of precautionary principle:

- **Useful as a tool to weigh pros and cons under uncertain, but plausible risks (Health Council NL, 2008);**

Malsch Techno Valuation

ObservatoryNANO

- **Should be replaced by less formal alternatives (Marchant & Sylvester, 2006):**
  - **Transnational dialogue and information sharing forums;**
  - **"Civil-society-based-monitoring";**
  - **Codes of conduct;**
  - **Enlisting a group of expert to issue periodic reviews;**
  - **International consensus standards;**
  - **Export controls;**
  - **Confidence building measures.**

Malsch

Techno

Valuation

ObservatoryNANO

Other risk management options include:

- **ALARA (As Low As Reasonably Achievable);**
- **BACT (Best Available Control Technology) (Tyshenko & Krewski, 2008).**

Malsch

Techno

Valuation

ObservatoryNANO

2.3 Sustainability

- **Multidimensional concept (environmental, technological, social);**
- **Most widely used definition (Brundtland Commission):**

  "To meet the needs of the present without compromising the ability of future generations to meet their own needs."
- **Sustainable development of nanotechnology requires Technology Assessment and Life Cycle Assessment.**

Malsch

Techno

Valuation

ObservatoryNANO

2.4 Governance

- **Governance encompasses processes of organizing a State involving government bodies and other stakeholders;**
- **Risk governance includes the totality of actors, rules, conventions, processes and mechanisms concerned with how relevant risk information is collected, analysed and communicated, and how management decisions are taken (IRGC, Renn, 2005);**

Malsch Techno Valuation

ObservatoryNANO

The IRGC Risk Governance Framework consists of five elements:

- **Risk pre-assessment;**
- **Risk appraisal;**
- **Characterisation and evaluation;**
- **Risk Management;**
- **Risk Communication.**

Opinions about governance of nanotechnology differ along 4 dimensions (Kjølberg et al, 2008):

- **Time;**
- **Uncertainty;**
- **Complexity in terms of higher order effects;**
- **Complexity with respect to values.**

Malsch

Techno

Valuation

ObservatoryNANO

3 Codes of conduct

A wide variety of codes of conduct or other voluntary risk management tools for uncertain risks has been proposed including:

- **EC code of conduct for responsible nano-research;**
- **Voluntary Nanocode;**
- **NanoRisk Framework (ED & Dupont);**
- **Company codes.**

IRGC recommends step by step harmonisation process of the different codes (Grobe et al 2008)

Malsch
Techno
Valuation

ObservatoryNANO

Codes of conduct are part of broader framework of activities for responsible nano development:

- **Defining guiding principles (e.g. NGO's);**
- **Risk governance, including EC code;**
- **Capacity building & participation initiatives (e.g. stakeholder dialogues by governments, CEFIC).**

UNESCO and OECD WPN have created platforms for discussing responsible nanotechnology at global scale.

Malsch
Techno
Valuation

ObservatoryNANO

4 Responsibility issues in current nanoscience and nanotechnology

Table 4.2 Individual and collective responsibility for nanotechnology development
- Governance (choices in limited resources, benefits, sustainable, scenario/foresight): agricultural production, textiles, the construction sector and the environment (groundwater remediation); - Innovation, intellectual property: agricultural production and textiles; - Precaution, risk, dual use: agricultural production, textiles, the construction sector, security, the environment (groundwater remediation), Chemistry and materials and ICT (Displays); - Justice, nano and the poor: agricultural production, textiles, regenerative medicine and the construction sector.

Malsch

Techno

Valuation

ObservatoryNANO

5. Analysis

- **Which stakeholder groups are responsible for what?**
- **What can they do to take responsibility?**

Malsch

Techno

Valuation

ObservatoryNANO

5.1 Choosing priorities in nano research

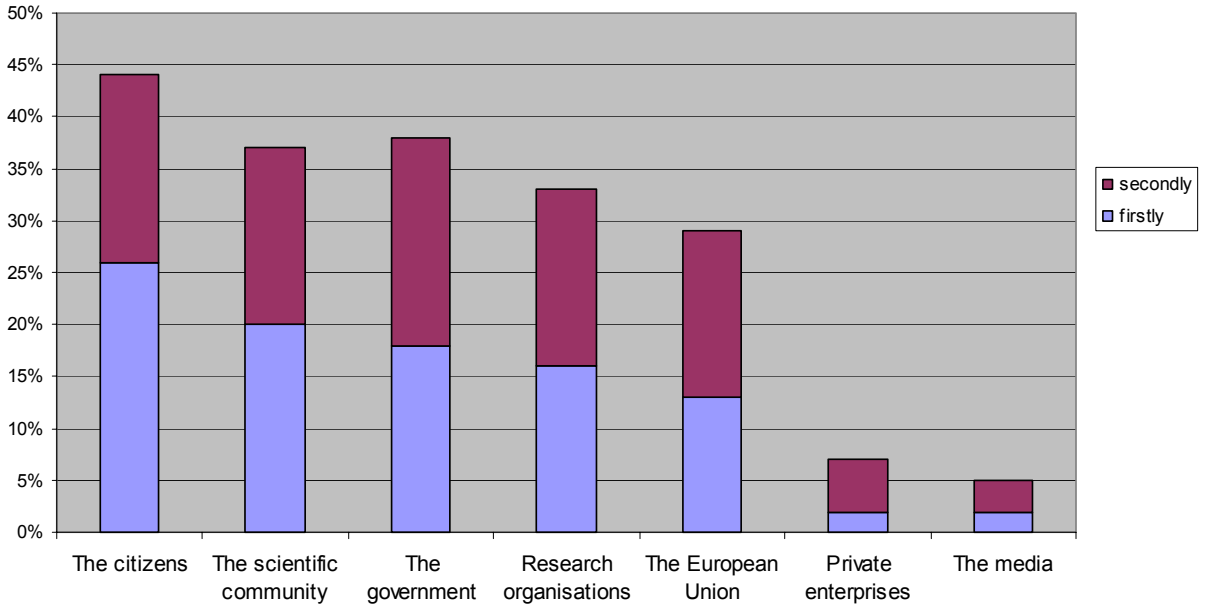
Currently responsible groups:	**Would like to be involved:**
Governments	Trade Unions (% for risk research)
Scientific community	Environmental NGO's (environmental technol.)
Industrialists	Patient associations?
Parliaments	Church-related organizations
	Marginalized populations?

Malsch
Techno
Valuation

ObservatoryNANO

5.1 Choosing priorities in nano research

Who should have the biggest influence on decisions about where money for research is spent?



Eurobarometer 2008, Young People and Science

Malsch Techno Valuation

ObservatoryNANO

How can different stakeholder groups take responsibility for research choices:

- **Open up system of scientific self-governance by (upstream) public engagement;**
- **Governments could "orchestrate stakeholder engagement process;**
- **Parliaments could take more initiatives setting priorities in public research budget.**

Malsch
Techno
Valuation

ObservatoryNANO

5.2 Precaution, risk, dual use

Stakeholder group	Responsibility
Scientific community	Risk assessment, safety & security
Industrialists	Occupational & product safety, cooperate more with authorities in risk assessment
Governments & Parliaments	Regulate market access, invest in risk research, be more proactive in regulating nanomaterials, labeling, IPR, ethical guidelines
Civil society	Lobby for interest or issue

Malsch
Techno
Valuation

ObservatoryNANO

5.3 Nano and the poor, justice

Group	How can they take responsibility?
EU and governments	Invest part of nanotechnology research budget in projects for UN Millennium Goals (MDG), stimulate cooperation with research groups in developing countries
Nanoscientists	Target research towards MDG, cooperate with colleagues in developing countries
Multinational companies	Invest more in R&D in developing countries
Civil society	Participate in discussion nanoresearch priorities, invest private funds in nanotech for MDG

Malsch
Techno
Valuation

ObservatoryNANO

5.4 Intellectual Property

IPR for nanotechnology issues:

- **Nanothickets of patents for platform technologies (Clarkson & De Korte, 2006, Bawa 2007);**
- **US Bayh-Dole act not effective in stimulating commercialization of public research results (So et al, 2008);**
- **New balance between interests of commercial investors and society as a whole is needed (Bowman, EGE, UNESCO);**
- **Patenting nature (ETC group).**

Malsch

Techno

Valuation

ObservatoryNANO

6 Conclusions and Policy options

- **Several principles of the EC Code of Conduct (e.g. precaution, sustainability) are not well-defined and experts as well as stakeholders disagree on the interpretation and usefulness. The EC or international organisations might consider clarifying their interpretation of the terminology used;**
- **Dual use aspects of nanotechnology in general (not only those covered by biosecurity legislation and codes of conduct) could be discussed and the issues not yet covered by existing policies highlighted. This could be stimulated by funding research on economic, legal, ethical and social aspects and by organising expert conferences to bring research results to the attention of policy makers;**

Malsch

Techno

Valuation

ObservatoryNANO

6 Conclusions and Policy options - 2

- A relatively new discussion on intellectual property rights could be stimulated more by funding research on economic, legal, ethical and social aspects and by organising expert conferences to bring research results to the attention of policy makers;
- More stakeholder groups would like to be involved in decisions on research priorities. The projects with upstream engagement could be evaluated, their effectiveness analyzed, and best practices disseminated.