# TA-KONZEPTE UND -METHODEN

*The effects of collective action initiated by TA experts in concrete technological fields are only in a small number of cases a topic of systematic research. In this context Rinie van Est's and Bart Walhout's essay is very instructive. For a period of more than eight years it shows the attempts and patterns of integrating science and important societal actors in a complex discourse on the issue of nanotechnology in one national case. The stepwise approach used by the Rathenau Institute gives an idea, how complex and tricky professional preparations for a debate with the general public can be and on which type of "reconstructions" of activities analytical research can be based on.*

*(PHB for the editorial team)*

## Waiting for Nano – Very Actively

### A Long-term View on the Role of the Rathenau Institute in Stimulating the Dutch Debate on Nanotechnology

**by Rinie van Est and Bart Walhout, Rathenau Institute, The Netherlands**

**This article describes the Rathenau Institute's long-term programmatic effort to study the societal meaning of nanotechnology and stimulate political and public debate about it. Three (interconnected) strands within the Dutch debate on nanotechnology since 2003 are distinguished. First, discussions about the safety of nanoparticles for the environment and human beings. Secondly, discussions on broader social and ethical issues related to nanotechnologies. To what extent does the Dutch debate pay attention to such broader issues? Thirdly, we will look at the debate in the Netherlands on whether and how to engage a broader set of people into the societal debate on nanotechnology.**

In describing these three strands of debate we pay attention to the activities of the Rathenau Institute, whose aim it is to stimulate political and public discussions about the social aspects of science and technology. The article shows that the activities of the Rathenau Institute are contingent with e.g. changes in the policy process, the political debate and the way NGOs are involved in the debate. This article therefore starts with some key moments in the Dutch political debate on nanotechnology so far. It ends with reflecting on how the Rathenau Institute has tried to stimulate this debate.

### 1 Milestones in the Dutch Debate on Nanotechnology

Bill Joy's "Why the future doesn't need us" in *Wired* in April 2000 formed an important starting point for the social debate on nanotechnology in the United States. This pamphlet pointed at the future dangers of robotics, gene technology and nanotechnology (runaway nanobots or Grey Goo). In June 2003 the *21st Century Nanotechnology R&D Act* was introduced in the United States, which demanded *inter alia* research into the social and ethical aspects of nanotechnology. In the same month this debate reached Europe, when the European Green Party together with the ETC group (2003), set up a conference in the European Parliament to examine social and ethical issues raised by nanotechnology.

For the Rathenau Institute this event signalled that nanotechnology had reached the political arena. Since the Dutch public debate on nanotechnology at that time was merely non-existent, the Institute decided to speed up its TA activities in this field. A few months later the government commissioned the Royal Netherlands Academy of Sciences (KNAW) to set up a committee to look at the opportunities and risks of nanotechnology. In April 2004 the Rathenau Institute published "How to value the small..." (van Est et al. 2004), which provided a first overview of applications of nanotechnology and related social issues. Together with the Dutch Parliament the Institute organized a public meeting "Small technology – Big consequences" in October 2004 (van Est, Van Keulen 2004). Two months before the KNAW (2004) had published its advisory report "How great can small be?". The tone of this report was much in line with the internationally very influential report "Nanoscience and nano-

technologies: opportunities and uncertainties" of the Royal Society and Royal Academy of Engineering (July 2004). It asked for research on risks and wider public engagement.

After various rounds of parliamentary discussions, the government announced in November 2005 that it would develop an integral vision on nanotechnology. An interdepartmental working group (ION) was established to prepare such a vision. ION consisted of various working groups on e.g. nanorisks, the ethical and legal aspects of nanotechnology, and public dialogue. A year later the Cabinet's vision on Nanotechnology was published. The vision "From something small to something great" pleaded for reserving a part of the nanotechnology research budget for toxicity research and announced plans for a national dialogue on nanotechnology. The final Action Plan Nanotechnology was published in July 2008. As part of this plan, an independent Committee for organizing a national dialogue was set up in March 2009. This dialogue started in September 2009 and will run to the end of 2010.

## 2 Risks of Nanoparticles

In the Netherlands - like elsewhere in the world – health and environmental safety is seen as the most pressing nano-issue. From a policy perspective two phases can be distinguished: an agenda setting phase (2003–2006) and a policy development phase (2007–now).

### 2.1 Putting Nanorisk on the Agenda: 2003–2006

In Spring 2003 the Canadian action group ETC Group (2003) put the risk issue on the international public agenda with the slogan "Size matters!", claiming that nano-sized materials needed special regulatory attention. To check the state of affairs in the Netherlands, the Rathenau Institute held a quick round of phone calls, which showed that the risks of nanoparticles were on the policy agenda of neither the Ministry of Health, Environment nor Social Affairs. The Dutch branch of Greenpeace and Environmental Defence Fund (*Vereniging Milieudefensie*) were not even aware of the term "nanotechnology". Some researchers at the National Institute for Public Health and the Environment (RIVM) wanted to study the safety of nanomaterials, but lacked funding because the issue was not yet on the policy agenda. To overcome this deadlock and strengthen awareness the Rathenau Institute did a short study and organised a workshop "Chances and risks of nanoparticles" in February 2004. This was the first time ever the community of nanoscientists in the Netherlands were confronted with societal and policy actors.

This workshop, the KNAW's plea for a rigorous risk policy, and the public meeting in Parliament in October 2004, raised enough awareness among policy makers to commission RIVM and the Health Council to prepare various inventory studies on risk issues. The Health Council (2006) published its advice in spring 2006. As a direct follow-up, the Rathenau Institute set up a workshop to comment on this advice and to discuss what should be the first steps in the governmental policy plan. The results were presented to the members of ION, who used it for preparing the Cabinet's vision (2006). A letter to parliament was sent also, but at that time politicians did not directly pick up the issue. The risk issue, however, was put clearly on the policy agenda, and policy makers were challenged to dig deeper into this issue.

### 2.2 Debating and Developing Nano-risk Policies: 2007–now

Also the Dutch Food and Consumer Products Safety Authority (VWA) picked up the nanorisk issue. Besides expert involvement, the VWA wanted to engage a broader set of social actors to develop their policy. Since they had little experience with such participatory processes the VWA contacted the Rathenau Institute. At the time the Institute studied the risks of nanotechnology in food products, because it expected that nanofood safety might be the first focus of public controversy.[1] Both organizations teamed up to set up a "Nanofood safety" workshop in February 2007, which revealed some serious barriers to set up effective risk policies. For example regulatory science and oversight kept circling around the lack of definitions and data about products on the market with nanoparticles. Consequently activities to actively

tackle these problems were constantly postponed. In 2008 some policy actions were taken to address some of the bottlenecks. For example, the Ministry of Environment initiated a stakeholder discussion platform. Moreover, the government commissioned RIVM and RIKILT Institute of Food Safety to map the nanoproducts already on the Dutch market. A central scientific information platform (KIR-nano) was also set up as part of RIVM.

In these years, the Rathenau Institute also tried to mobilise awareness among MPs. Nanotechnology was part of the parliamentary agenda in the annual debates about innovation. In 2007 in particular, statements in the press by the labour union and some environmental organizations were instrumental in putting the risk issue more firmly on the political agenda. The Rathenau Institute added to that by writing an opinion article in a well known Dutch newspaper on the same day as the parliamentary debates in 2007 and 2008 were planned. These opinion articles enabled close contacts with some MPs, who got seriously involved in the nanodebate. When in 2009 the employer organisations and unions came up with a joint advice on nanomaterials and worker safety, a separate parliamentary debate about nanotechnology was initiated. The Rathenau Institute facilitated a parliamentary hearing on June 3, 2009 about the chances and risks of nanoparticles to prepare for this debate.

## 3 Exploring Broader Social and Ethical Issues

The Rathenau study "To value the small…" showed that nanotechnology as an enabling technology plays a role in many application fields and touches upon many social issues ranging from privacy to the ethics of war (van Est 2004 et al.). Relatively new issues included human enhancement, the (im) possibility of self-reproducing nanobots, and the borders between living and non-living material. These latter issues are connected with the concept of NBIC convergence. At the end of 2001, the designers of the American *National Nanotechnology Initiative* (NNI) had introduced this term at the NSF workshop *Converging technologies for improving human performance* (Roco, Bainbridge 2002). This framed nanotechnology as enabling progress not only in the field of materials, but also within information technology, biotechnology and brain sciences. Moreover, nanotechnology became directly linked to the controversial objective of human enhancement. The NSF workshop has served as a starting point for expert studies and discussion on new emerging technologies and its social implications around the globe.

Over the years nanotechnology and NBIC convergence have served as search lights which enabled the Rathenau Institute to see all kinds of 'new' trends within science and technology. Examples of research fields or visions that fit the notion of NBIC convergence are: synthetic biology, ambient intelligence, molecular medicine, robotics, man-machine interaction. NBIC convergence also embodies huge bio-engineering ambitions as it delivers provoking prospects on human enhancement, creating synthetic life and making smart artefacts. Over the last years the Rathenau Institute has explored many of these themes by means of a range of projects and activities. NBIC convergence as heuristic concept thus has been influential in defining our own agenda. Since 2004, one of the main aims of the Rathenau Institute is to explore the social meaning of this "new technology wave" and put them on the radar of politicians, policy makers and a broader audience, both on the international and national level.

### 3.1 International Exploration of the New Technology Wave: 2003–now

On the European level, our director, Jan Staman, was part of the High Level Expert Group (HLEG) "Foresighting the new technology wave" (Nordmann 2004), which the European Commission had set up in reaction to the NSF workshop to explore the implications of NBIC convergence for Europe's R&D policy. The HLEG expected that converging technologies will change the "traditional boundaries between the self, nature and social environment" (Nordmann 2004, p. 31) and thus will lead to a wide range of social and ethical debates. In addition the Rathenau Institute has done various TA studies for the European Parliament. In 2006 we studied NBIC convergence from a historic, public debate and technological perspective by order of the European Parliament (van Est et al.

2006). RFID is a key technology within the ambient intelligence vision. In 2007 we published the report "RFID and identity management in everyday life" (Van 't Hof 2007) for the European Parliament. Together with TAB, the Rathenau Institute did a study on human enhancement and organized a workshop around this theme in the autumn of 2009 (Coenen et al. 2009). Recently, the European Parliament commissioned the Rathenau Institute to study the social and policy impacts of new engineering trends embedded in the concept of NBIC convergence (van Est et al. 2010).

Besides working for the European Commission and Parliament, the Rathenau Institute has also been active in other international networks. At the end of 2004, together with TNO and IPTS in Seville, the Rathenau Institute set up the workshop "Ambient Intelligence: In the service of Man?" during the EUSAI 2004 conference in Eindhoven (Markopouluos et al. 2004). In 2006 a workshop session on the ethics of persuasive technology during the First International Conference on Persuasive Technology for Human Well-Being was organized (IJsselsteijn et al. 2006). At the end of 2006, the Rathenau Institute published "Constructing Life" (De Vriend 2006). In May 2006 we had made contacts with the burgeoning synthetic biology community during the "Synthetic Biology 2.0" conference in Berkeley. A year later in June our study "Constructing Life" was presented and widely distributed at the "Synthetic Biology 3.0" conference in Zurich. At that conference a plenary session was set up also to discuss various social and ethical issues. In the field of human enhancement, we cooperated with the British Embassy and Parliamentary Office of Science and Technology to publish "Reshaping the human condition" (Zonneveld et al. 2008). In the same year, the essay "Future man – No future man" was written (van Est et al. 2008).

### 3.2 Stimulating National Awareness about the New Technology Wave: 2007–now

In 2004 the Rathenau Institute felt that the time was not ready to put the concept of NBIC convergence centre stage. At that moment the debate was only slowly growing around the term nanotechnology. Over the last few years, however, the Rathenau Institute is emphasizing the importance of NBIC convergence. In particular it has tried to give NBIC convergence a clear position within the nanodebate, in order to create awareness about its broad technological impact and to uncover the broader social and ethical issues related to nanotechnology. Especially the debate on synthetic biology, as a key exemplar of convergence, has been instrumental in communicating this. In 2007 we updated the study "Constructing Life" in Dutch (De Vriend et al. 2007), informed the Parliament about the policy implications for the Dutch situation through a Message to Parliament (van Est et al. 2007), and published an opinion article in a well-known national newspaper. These activities triggered the attention of some MPS and led to more than a dozen parliamentary questions, which put synthetic biology firmly on the political agenda.

Besides, the Rathenau Institute has set up studies and debates about ambient intelligence and human enhancement. In 2007 a study was published about the potential influence of the ambient intelligence vision on healthcare (Schuurman et al. 2007). As early as November 2003 a large public festival about human enhancement was organized. In the meantime, policy makers have become interested in this sensitive issue. For example, in May 2010 the Ministry of Justice together with the Rathenau Institute set up a large public conference on human enhancement, half a year after a smaller meeting with high-level civil servants had been organized.

To unlock NBIC convergence for a large audience we published the book "*Life as a construction kit: Exploring the ethics of the new technology wave*" (Swierstra et al. 2009). The book describes various fields of development that the Rathenau Institute has paid attention to over the last few years, notably synthetic biology, ambient intelligence, molecular medicine, and brain-machine interaction. The book was presented at the starting conference of the national dialogue on nanotechnology in September 2009. One central message was that a public dialogue on nanotechnology actually is a debate about a whole new wave of technologies. A second one was that converging technologies represent a radical expansion of the building or engineering logic of non-living nature

in the direction of living nature. For the first time in history the organic world appears to become mouldable in the sense that it can be controlled, designed and built. In fact, "Life as a construction kit" echoed the HLEG which commented that the agenda underlying NBIC is the total constructability of humanity and nature. The book received a lot of media attention and also led to a parliamentary question about whether the public dialogue on nanotechnology also includes discussing NBIC convergence. Moreover, policy makers are gradually picking up the NBIC convergence frame.

## 4 Discussing Nanotechnologies

At the beginning of this century, concerns about the science-society relationship and calls for public dialogue became part of the mainstream policy discourse in Europe. To avoid nanotechnology from becoming 'the next GM' terms like "upstream public participation" entered the European discourse. Based on its experience with participatory TA, the Rathenau Institute took a more sober, step by step approach towards stimulating public engagement on nanotechnology. It was also realized that it was (and is) far from clear how a meaningful debate about such a broad development as nanotechnology should look like. This section describes various Rathenau activities to involve experts, NGOs and the wider public and its constant search (via study and trial and error) for ways to achieve the engagement of these various social actors.

### 4.1 Involving Policy Makers and Social Scientists: 2003–2004

In 2004 the Rathenau Institute started with the most tangible issue, safety aspects of nanomaterials. The workshop started the formation of a network of nanoscientists (who were setting a big public-private consortium called NanoNed), stakeholders and social scientists. Based on the April scoping paper "To value the very small…" various workshops on different application areas were organized. In October 2004 these network activities resulted in a public meeting in the Dutch parliament. A central question in the parliamentary hearing was how to proceed with the nanodebate. In April 2004 the scoping paper had come up with a "sober view on nanotechnology as a tool in the societal debate", which consisted of seven conditions for dialogue and governance. It was recommended to hold the debates on nanotechnology as part of current technological trends and social debates, and to keep in mind that this will lead to both new and old issues. The Rathenau Institute recommended to "work swiftly towards a widely supported public agenda". To achieve this it was thought to be important to split up the debate by application area.

### 4.2 Involving NGOs not Self-evident: 2005–2006

This last recommendation found wide support during the public meeting. It was thought that talking about specific application areas would motivate societal organisations to become involved in the nanodebate. Based on this public engagement hypothesis the Rathenau Institute initiated further research into several specific application areas and its social aspects. This exercise, however, did not succeed in more engagement. We experienced that just a few innovation networks had developed. As a result the expected impact of nanotechnology was surrounded by many uncertainties, and societal actors were not yet aware or interested in these developments. Only the involvement of NGOs on the risk issue was growing. As a result the Rathenau Institute felt forced to investigate the conditions for involving other stakeholders in the debate about nanotechnology. This question had become relevant from a political point of view since the Cabinet's Vision on Nanotechnology in November 2006 had announced plans to organize a national nanodialogue. Nobody in the Netherlands, however, had a clear idea on how this should be done.

### 4.3 Towards a National Nanodialogue (2007–now)

The Rathenau Institute believed it was crucial to get a clear picture of the state of the debate in order to address the design question. As a first step a workshop with societal organisations was set up

to ask them how they wanted to be involved in the nanodebate. These NGOs had regularly been confronted with topics like the safety of genetic modification or chemical substances and tough struggles with industry. It was concluded that, in particular, small NGOs lacked the capacity to become involved in such a new and complex development like nanotechnology. Next the Rathenau Institute studied the involvement of (inter)national NGOs in the field of nanotechnology, the results of research into public perceptions, and how the Dutch expert debate on nano had evolved since 2004. Based on these insights the Rathenau Institute drew up ten recommendations for governmental action in stimulating the nanodebate (Hanssen et al. 2008). The study was published at the time the government was preparing its Action Plan on Nanotechnology. A key recommendation of the Rathenau Institute – a clear distinction between the debate about risk policy and the exploration of emerging social and ethical issues – was implemented by the government. For the risk issue a stakeholder platform was set up, while social and ethical issues are now under discussion in a national dialogue organised by an independent commission (see http://www.nanopodium.nl).

The national dialogue took off in September 2009 and will run until the end of 2010. As told above, the Rathenau Institute presented the book "Life as a construction kit" at the kick-off meeting to indicate that the debate should be about the social impact of a new technology wave. The organising commission made important choices corresponding to the ten recommendations of the Rathenau Institute. Most important is that the agenda is open to the interests of stakeholders. Stakeholders and other organisations have been asked to submit their own proposals and organise the dialogue activities themselves. During the first phase of the nanodialogue the focus is on informing a wider audience. Most of the activities at this stage are facilitated by debating centres, educational publishers and social scientists. So although the bottom-up approach should enable small NGOs to participate, just a few NGOs are involved up till now. The Rathenau Institute has also anticipated the fact that the social debate on nanotechnology is gradually moving towards a larger audience. Because of this a magazine is published and a special website is created, which now play a role in various activities in the national dialogue.

## 5 Actively Waiting for the Nanodebate

This article shows that the Rathenau Institute's activities to stimulate (the above three strands within) the nanodebate depends heavily on the condition of the debate itself. Paraphrasing Gidden's (1984) one might speak of the *duality of the debate*, in the sense that the state of debate both constrains and enables debate. The Rathenau Institute acknowledges that each of its activities to stimulate the debate is performed within a pre-existing social context, including the state of the (inter)national debate, the policy process and the parliamentary debate, and the extent to which social scientists, NGOs and citizens are informed and actively engaged. That context offers ample opportunities to influence the debate, but to seize these opportunities one has to be very aware of and informed about the relevant context. The art of stimulating the debate is not to force people to engage, but to tempt them to get involved based on their own interests and curiousness.

To deal with the duality of the nanodebate, the Rathenau Institute pursues an active waiting strategy, which consists of three connected elements: anticipating the debate, constant interaction with the context, timely intervention. Anticipating the debate demands an institutional ambition to operate at the forefront of the debate, and an organizational culture that aims to be visionary and allows picking up issues at considerable arm's length of the current policy and political agenda. Constant interaction with the relevant context implies that the project team needs to be well tuned in and stay tuned in the various relevant networks. As exemplified by the study "Ten lessons for a nanodialogue" (Hanssen et al. 2008), the context itself is an object of constant research. The project strategy and activities have to move along with the changing context. To do this one needs to be very reflexive on the current context and debate. Moreover, one should always try to think about and anticipate the next step within the debate. This brings us to the third element: intervening in the debate. If an intervention is too much out of line of the current debate and people's priorities, there

is a high probability that it will have a low impact. This principle seems to be at odds with the ambition to be at the international forefront of the debate. For two reasons this does not have to be the case. First of all, it is all right to push ahead the debate in various ways outside the political arena, by organizing a festival, a play, or writing opinion articles. Moreover, different contexts and networks provide for ample opportunity to develop your input in other debating contexts. For example, with respect to NBIC convergence we felt it was not expedient to stress the notion of NBIC convergence at the early start of the Dutch nano-debate. The international context still provided ample room for discussing, studying and elaborating the social meaning of NBIC convergence, which enabled the Rathenau Institute to prepare for the right moments to bring in the notion of NBIC convergence in the Dutch debate.

## Note

1) In particular we had been triggered by a comment made by the American Organic Consumers Group during a hearing on nanotechnology of the US FDA (Food and Drug Administration) at the end of 2006. The *New York Times* reported that the American Organic Consumers Group referred to the risks of genetic modification as "peanuts" compared to the risks of nanotechnology (Feder 2006).

## References

*Coenen, C.; Schuijff, M.; Smits, M.; Hennen, L.*, 2008: Shifting Boundaries, Changing Concepts, and the Governance of Human Enhancement. Brussels: European Parliament, STOA

*De Vriend, H.*, 2006: *Constructing life:* Early Social Reflections on the Emerging Field of Synthetic Biology. The Hague

*De Vriend, H.; van Est, R.; Walhout, B.*, 2007: Leven maken: Maatschappelijke reflectie op de opkomst van synthetische biologie. The Hague

*Feder, B.*, 2006: Engineering food at the level of molecules. New York Times October 10, 2006

*Giddens, A.*, 1984: The Constitution of Society: Outline of the Theory of Structuration. Berkeley

*Gingrich, N.*, 2001: The age of transitions. In: Roco, M.; Bainbridge, W.S. (eds.): Societal Implications of Nanoscience and Nanotechnology. NSET Workshop Report, Arlington, pp. 23–27

*Hanssen, L.; Walhout, B.; van Est, R.*, 2008: Ten Lessons for a Nanodialogue: The Dutch Debate About Nanotechnology thus Far. The Hague

*IJsselsteijn, W.; de Kort, Y.; Midden, C. et al. (eds.)*, 2006: Persuasive Technology: First International Conference on Persuasive Technology for Human Well-being, PERSUASIVE 2006 Eindhoven, The Netherlands, May 2006, Proceedings. Berlin

*Joy, B.*, 2000: Why the Future Doesn't Need Us. In: Wired 8.04 (2000); http://www.wired.com/wired/archive/8.04/joy_pr.html (download 26.7.10)

*KNAW Werkgroep gevolgen nanotechnologie*, 2004: Hoe groot kan klein zijn? Enkele kanttekeningen bij onderzoek op nanometerschaal en mogelijke gevolgen van nanotechnologie. Amsterdam

*Markopoulos, P.; Eggen, B.; Aarts, E.; Crowley, J.L. (eds.)*, 2004: Ambient Intelligence: Second European Symposium, EUSAI 2004 Eindhoven, The Netherlands, November 2004, Proceedings. Berlin

*Nordmann, A.*, 2004: Converging Technologies: Shaping the Future of European Societies. Brussels: European Commission, High Level Expert Group "Foresighting the new technology wave"

*Roco, M.; Bainbridge, W.S. (eds.)*, 2002: Converging Technologies for Improving Human Performance: Nanotechnology, Biotechnology, Information Technology and Cognitive Sciences. Arlington, Virginia

*Royal Society & Royal Academy of Engineering*, 2004: Nanoscience and Nanotechnologies: Opportunities and Uncertainties. RS Policy document 19/04

*Schuurman, J.G.; Moelart, F.; Krom, A.; Walhout, B. (eds.)*, 2007: Ambient Intelligence: Toekomst van de zorg of zorg van de toekomst? Den Haag

*Swierstra, T.; Boenink, M.; Walhout, B.; van Est, R. (eds.)*, 2009: Leven als bouwpakket: Ethisch verkennen van een nieuwe technologische golf. Kampen

*van Est, R.; Malsch, I.; Rip, A.*, 2004: Om het kleine te waarderen… Een schets van nanotechnologie: publiek debat, toepassingsgebieden en maatschappelijke aandachtspunten. Den Haag

*van Est, R.; van Keulen, I.*, 2004: Small Technology – Big Consequences: Building up the Dutch Debate on Nanotechnology from the Bottom. In: Technikfolgenabschätzung – Theorie und Praxis 13/3 (2004), pp. 72–79

*van Est, R.; Enzing, C.; van Lieshout, M.; Versleijen, A.*, 2006: Welcome to the 21st Century: Heaven, Hell or Down to Earth? A Historical, Public Debate and Technological Perspective on the Convergence of Na-

notechnology, Biotechnology, Information Technology and the Cognitive Sciences. Brussels

*van Est, R.; de Vriend, H.; Walhout, B.*, 2007: Constructing Life: The World of Synthetic Biology. The Hague

*van Est, R.; Klaassen, P.; Schuijff, M.; Smits, M.*, 2008: Future Man – No Future Man: Connecting the Cultural, Political and Technological Dots of Human Enhancement. The Hague

*van Est, R.; van Keulen, I.; Geesink, I.; Schuijff, M.*, 2010: Making Perfect Life: Bio-engineering (in) the 21st Century. Brussels

*van 't Hof, C.*, 2007: RFID and Identity Management in Everyday Life. Brussels

*Zonneveld, L.; Dijstelbloem, H.; Ringoir, D. (eds.)*, 2008: Reshaping the Human Condition: Exploring Human Enhancement. The Hague: Rathenau Institute in cooperation with the Science and Innovation Network of the British Embassy and the Parliamentary Office of Science & Technology (POST)

### Contact

Dr. ir. Rinie van Est
Email: q.vanest@rathenau.nl

Ir. Bart Walhout
Email: b.walhout@rathenau.nl

Rathenau Institute
P.O. Box 9 53 66
2509 CJ The Hague, The Netherlands
Phone.: +31 - 70 / 3 42 - 15 42
Fax: + 31 - 70 / 3 63 - 34 88
Internet: http://www.rathenau.nl

« »

# Technikfolgenabschätzung 2.0

**von Michael Nentwich, ITA Wien**

**Mit einem Überblick zur aktuellen, eher bescheidenen Präsenz der TA-Community im sog. Web 2.0 beginnt dieser empirisch angelegte Beitrag. „Facebook", „Wikipedia", Blogs und „Twitter" sind dabei die Formate, in denen sich diese Spuren der TA-Web 2.0-Präsenz finden. Der Autor schließt mit dem Plädoyer an die TA-Praxis, das Web 2.0 nicht sich selbst zu überlassen, da es in zunehmendem Maße das öffentliche Bild von TA mitprägt.[1]**

## 1 Einleitung

Während sich Cyberscience (Nentwich 2003, auch E-Science) als Forschungsfeld in den letzten Jahren nicht nur in der STS-Community, sondern auch in der TA etabliert hat, gibt es noch wenig Forschung zum engeren Thema Wissenschaft und Web 2.0. Eine gewisse Ausnahme stellt das Verbundprojekt „Interactive Science" (finanziert durch die VW-Stiftung)[2] dar, in dessen Rahmen Recherchen und erste Analysen durchgeführt wurden. Thematisch zentrierten sich diese Arbeiten auf die virtuelle 3D-Welt *Second Life*, in der man sich mit Hilfe von Avataren z. B. in Konferenzräumen treffen kann (König, Nentwich 2008), auf die Online-Enzyklopädie *Wikipedia* mit unzähligen freiwilligen, auch wissenschaftlichen AutorInnen (König, Nentwich 2009) und auf den Microblogging-Dienst *Twitter*, bei dem Kurzmeldungen ins Internet an die eigenen „AbonnentInnen" verschickt werden (Herwig et al. 2009). Auch wenn die Suchmaschine *Google* nur am Rande dem Web 2.0 zuzuordnen ist, untersuchten wir sie und einigen Anwendungen im Umfeld, nämlich *Google Books* und *Google Scholar*, bei denen ja ebenfalls die NutzerInnen in gewisser Weise aktiv mitwirken, etwa durch Linksetzung (König, Nentwich 2010). Aktuell untersucht das ITA in Wien das Thema „Soziale Netzwerke und die Wissenschaft". Der folgende Beitrag nimmt seinen Ausgang bei Zwischenergebnissen dieses