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Introduction

The aim of this article is to discuss the future of deliberative processes related to nanotechnology. Within the NANOPLAT project (7FP: Science in Society) we have made an evaluation of selected deliberative processes, and these evaluations constitute the data for this article. Since 2004 more than 60 deliberative processes have taken place within the field of nano-technology (Scholl and Petschow, 2008). With the public discourse on GMO in mind, initiatives have been taken in many countries to involve citizens and consumers in various deliberative processes. Most of them have taken place in Europe, USA and Australia. They may vary substantially as far as both resources and use of time are concerned, but they have in common a bottom-up involvement of individuals in relatively complicated technical matters. However, to what degree have they increased to the democratisation of technology and science? In which direction may future deliberative processes within nano-technology be developed..

We have divided our article into four parts.

1) We will start with a discussion of the concept of deliberation. What do we mean by deliberative processes? When is a process not deliberative?

2) We will continue with an overview of relevant deliberative processes and also give more in-depth analyses of selected processes.

3) We will the move to the question about a platform for deliberative processes related to nanotechnology. How could this platform look like, and who could be responsible for sunning such a platform?

4) In the concluding part we will discuss the new generations of deliberative processes? These are the main questions put forward

in this article. One theoretical point of departure is the Risk Society of Ulrick Beck (1992). The basic idea behind the Risk Society theory is that today we are to a large extent concerned with man made risks. This does not mean that it is more dangerous to live in modern times, rather the opposite. However, while individuals in pre-modern times were exposed to threats like famine, natural catastrophes, illness and wild animals, modern humans worry about "civilization products" like toxic waste, nuclear disasters and mad cow disease. Modern risks also, paradoxically, often result from attempts at controlling risk, such as when an insecticide like DDT, developed to protect crops, becomes hazardous to birds. It it is often the solutions for one problem that end up generating risks. Asbestos solved problems in the building and construction industries in the 20th century, as it was non-flammable, but at the same time, asbestos created health problems among construction workers.

As Beck theorises and recent experiences with technologies like GM crops and incidents like the UK BSE crisis indicate, modern citizens have to a large degree lost faith in science. This has been called a crisis of confidence. However, the real crisis is that to some extent, citizens have no others to trust than scientists, leaving them to fall into what Wynne (1983) called virtual trust, or "as-if" trust. This too is a particularly modern dilemma. To understand the potential risks of emerging technologies like biotechnology and nanotechnology, we need what Beck (1986) calls the "sensory organs of science" and therefore although citizens are sceptical about new technologies and the ability of scientists to predict potential risks, they are at the same time reliant on scientific knowledge as a way to understand the problems. This means that while we are perhaps more sceptical to science than ever before, we are also more dependent on it.

Thus, Beck (1992) has suggested that new social movements, such as modern environmentalism will play a decisive part handling moderne risks. Deliberative processes may be a part of these social movements.

The concept of deliberative processes

The concept of deliberative processes can be seen to have emerged from theoretical work around the concept of deliberative democracy. Deliberative democracy or discursive democracy is not old as a specific concept. It was originally coined by Bessete in his book Deliberative Democracy (1980), however, the concept can also be linked to the work of Habermas (1989) and his attempts at defining the model for public debates. The concept of a deliberative process is however not straightforward and without debate.

For a decision to be called deliberative, Renn (1999) emphasises that it is essential that it relies on mutual exchange of arguments and reflections rather than on decision-making based upon the status of the participants, power or political pressure. In addition, deliberative processes should be governed by established rules of rational discourse (Elster, 1998). The idea behind the embracing deliberation as decision aid, is that collective decisions reached by arguing may be considered as reasonable solutions to given problems because they are based upon convincing reasons. Thus, Renn (1999) argues that deliberative processes are better suited to deal with environmental challenges than the representative democracy, based upon majority votes, because deliberation can produce common understanding of the problem and of the positions of various groups of stakeholders. Furthermore, deliberation can produce new options and new solutions, and has the potential to document the full scope ambiguity associated with the problem. This is relevant for our project, because here the linkage between the discourses of environmental problems and nanotechnology seems strong.

According to Cohen (1989) there are four criteria for an ideal deliberation:

- It is a free discourse; participants regard themselves as bound solely by the results and preconditions of the deliberation process.
- It is reasoned; parties are required to state reasons for proposals
- Participants in the deliberative process are equal
- Deliberation aims at rational motivated consensus.

These criteria seem to fit rather well with Habermas' thinking around the ideal conditions for societal debates and seem to be relevant for both common man style deliberation and for stakeholder deliberation. It is easy to understand that it will of course be difficult to reach these goals and ideals in practice, however, this does not affect their status as 'ideals'. Putting the operationalisation of these ideals aside, we see the concept of deliberative processes complicated along two dimensions. The first is related to the degree of consensus, the second to the degree of institutionalisation. We think it is worth considering and further debating the extent to which achieving consensus is the most desirable aim for deliberative processes. Consensus is one possible approach, but another is tolerated consensus - an agreement of the position of the stakeholders involved in the process. In a way, this means recognising the value of conflict in deliberative processes and of recognising motivations for disagreement rather than necessarily finding grounds for agreement. On the other hand, consensus should be distinguished from compromise. A compromise is a product of bargaining, and belongs more to the concept of new governance (see below). In terms of the degree of formal institutionalisation, to some extent the concept of deliberative processes is used to processes with relatively low levels of institutionalisation such as citizens' panels, public forums and consensus conferences. We, however, would also apply see the concept applying to more institutionalised praxis such as formal hearings and advisory committees. This means that we would include the European Standardisation process as one important deliberative tool for the nanotechnology discourse, one that is particularly highly relevant for the expanding consumer market. In standardisation work we find strong elements of stakeholder deliberation,

combined with citizen involvement. In addition, the outcome of such processes has a large impact on the field. This makes such processes potential candidates for our analysis.

An additional issue is that while deliberative processes are usually regarded as a democratic supplement, they could also be seen as a way to undemocratically bypass the regular representatives of the common voice. For example, if the official views of consumer organisations, environmental organisations and/or political parties are known but a deliberative processes excluding them is arranged as a way to capture a 'public' voice. We will return to this discussion on the concluding chapter.

While we would in principle prefer to leave pure research processes out of our analysis, when it comes to subject matter and formulated opinions it is not easy to point to the difference between a focus group research session and a deliberative process. In our opinion it would mainly bear on the strategic positioning of the event: a deliberative process is supposed to have an impact, to influence policy makers or macro managers directly, while a focus group session as an element of a research process is potentially influencing things indirectly, via the reporting and the translation by the researchers.

A common feature of the deliberative process and the focus group interview that is particularly problematic is that it seems necessary to supply information to participants early in the event, in order to achieve an interesting exchange of views and information. We can easily imagine that the quality and possible bias of this initial information will determine the outcomes of the deliberations to a large degree and that desired reactions could be produced or manipulated by the organiser. The character of the supplied information would therefore be a relevant consideration in our evaluative criteria. Even without any conscious manipulation, there is a question of how orchestrated the process is. Power, resources and knowledge will not be evenly distributed, no matter how neutral and unbiased the organiser tries to be and how this plays out in practice will be relevant to any review process.

The question of who is represented in a deliberative process can also be seen as a part of the problematic nature of the concept. On

this, we would like to emphasise our interest in at least two types of deliberation; processes aiming at the representation of the common voice, and processes involving stakeholders, who represent the interests of their various "constituencies" in business and political/organisational life.

Two related concepts: New governance and the stakeholder appoach

We will now proceed by discussing deliberative processes in a kind of dialogue with two rather similar concepts, those of new governance and the stakeholder approach. They are both part of a new theoretical and political alternative to traditional democratic processes. The classical representative democracy builds upon the ideal of one man/one vote and that political decisions within this numerical democracy are based upon the power of the majority. The new governance, the stakeholder approach and deliberative processes (deliberative democracy) offer alternatives or supplements to traditional processes, by introducing lobbying, negotiations and consensus driven ideals.

The shift from Government to Governance and the new regulatory state, presents a substantial development in legislation, regulation and public policy in Europe (Lindblom 1977; Majone 1996; 1999). To some degree, it represents a deregulation of public policy; in other areas we have witnessed a re-regulation. This may, however, vary from one country to another because of different political traditions and the fact that the welfare state was developed along different paradigms in the 1960s and 70s.

The main idea behind the concept of governance is to involve stakeholders in taking responsibility for the political, economic and juridical development in societies, in dialogue with political authorities on European, national and local levels. In the White Paper on European Governance for the EU (COM (2001) 428 final) the document defines the main principles of governance as: openness, participation, accountability, effectiveness and coherence. The discussion on European governance has also included democratic legitimacy and subsidiary as other important principles. What roles have stakeholders

to play in the regulation of modern nanotechnology? Is it possible to identify these main principles of governance in the nanotechnology discourse?

In recent literature we have seen that governance and the new regulatory state are concepts that are used in very similar ways to describe the same phenomenon. This new theoretical understanding of the regulatory state/new governance implies a more realistic description of what regulation is and how it works, a realization of the regulatory limits of state authority, and the corresponding potential of private actors to block and restrain public policies. It also includes an awareness of the possible positive contributions of private firms, organisations and associations to enhance public goals and policies, and, more controversially, a new normative model of how regulation is supposed to work, emphasizing the interactive and interdependent nature of regulation. However, Olsen argues (2002) that formal processes of reform of governance may not always produce a precise and stable policy outcome. One of the reasons for this instability is the fact that not all stakeholders have resources to play the expected part in the political process. For nanotechnology this might be the case for almost all stakeholders.

Within the food sector we have seen that industry and retailers in some countries have taken independent initiatives to develop standards and health related schemes. These activities, aimed at the enhancement of consumer trust and brand value and avoiding litigation claims, seem increasingly to co-exist and partly overlap with public regulations in the same area (Marsden et al. 2000). This kind of private regulation has been named self-regulation, and is increasingly used by the EU to regulate in a number of subject areas, e.g. food safety and environmental standards (e.g. Majone 1999).

Commentators claim that in some countries and some sectors, these private, often retailer led initiatives, take on responsibilities public authorities otherwise would have to cover. In some countries a pragmatic division of tasks and responsibilities seems to have evolved between regulating authorities and big businesses, saving public finances and maintaining markets for big business. In this sense, co-regulation (Black 2002; COM (2001) 428) and private interest regulation (e.g. Marsden et al. 2000) have been suggested as

appropriate terms for this situation. One should perhaps not be too naïve concerning the nature of a process where business is kind enough to regulate itself, but if on the other hand the government decides on goals and ambitions, self regulation might be cost effective.

Standardisation is another potentially important tool within the governance concept. Here the representatives from the consumer organisations might be said to represent the lay or citizen perspective and interests. European standards have been used frequently in the implementation of community policies. In support of the European Commission's New Approach directives for certain product areas, standards have become voluntary solutions to demonstrate compliance with the legal requirements (Tørres et al. 1994; Gezelius, 2002). There has been an increasing focus on the role standards can play in protecting the environment and supporting sustainable development. European standards often deal with aspects of trade, quality, health and safety of products and processes. By additional consideration of environmental aspects, European standards could contribute to the implementation of environmental policies. An interesting challenge to nano standardisation is to decide whether we have to have new sets of rules in order to deal with materials in the nano scale. In other words; is silver always silver?

What do we mean by a stakeholder approach? The "classical" stakeholder concept was developed within the management theory dealing with the relationship between business firms and corporations on the one hand, and their environment on the other. It was an expansion of the well-known shareholder concept. Firms have to take into account not only the interests of their shareholders, but also their stakeholders. In his important book "Strategic Management: A Stakeholder Approach", Freeman defines stakeholders as "any group or individual who can affect or is affected by the achievement of the firm's objectives" (Freeman 1984). During the last twenty years this concept has been developed in various directions, and at least three of them are relevant here:

• First, we have seen the development towards a "Corporate Social Responsibility" (Carroll 1999; Windsor 2001). Businesses have responsibility beyond the economic performance of the company, and

take into account other interests than their shareholders'.

• Second, the concept has expanded from the business management theory to society; it integrates the responsibilities of organisations, policy makers, science and consumers (Dentchev and Heene 2003). This expansion has been controversial, but not without success (Scholl 2000).

• Finally, we have witnessed a debate over the categorisation of various groups of stakeholders. The most relevant distinction is between primary and secondary stakeholders: "A primary stakeholder group is one without whose continuing participation the corporation cannot survive. Secondary stakeholder groups are defined as those who influence or affect, or are affected by the corporation" (Clarkson 1995).

Deliberative processes, the stakeholder approach and new governance have one element in common. They all represent an alternative or a supplement to the representative numerical democracy along a common dimension. While the representative democracy is constituted around voting behaviour and the relationship between voters and their representatives, the three models build their legitimacy "on the degree to which those affected by it have been included in the decision-making processes and have the opportunity to influence the outcomes" (Young, 2000). This is taken care of in the representative democracy by rules of hearings and by organised lobbyists, but the three other models take the involvement of stakeholders further.

However, it is also possible to identify differences between deliberative processes on the one hand, and the representative democracy, the stakeholder approach and new governance on the other. The three last models are all constructed around majority decisions or bargaining solutions based upon power of the majority, while the deliberative democracy's ideal is decisions based upon arguments and public discourse.

Review of two generations of deliberative processes on Nanotechnology in Europe.

In the following we will present two generations of deliberative processes. A first 'wave' of public engagement processes was launched in the years 2004 to 2005, followed by a second ripple beginning in 2006 and running to processes conducted in 2008.

First Generation of Deliberative Processes on Nanotechnology

As early as in 2004, the Australian Commonwealth Scientific and Industrial Research Organisation (CSIRO) held a one-day workshop with community members, nanotechnology specialists, CSIRO staff, and government representatives to explore citizens' views on the social, economic and environmental implications of nanotechnologies (Bendigo Workshop on Nanotechnologies). Discussions in working groups were stimulated by scenario kits and revealed a mix of optimism and concern among the participants with respect to nanotechnologies. Their benefits were particularly appreciated in case of enhancing socioeconomic well-being and environmental sustainability (Mee et al., 2004). CSIRO used the findings to draft a 'community issues checklist' helping researchers and research planners to reflect on the social, economic and environmental issues linked with nanotechnology from citizens' perspective.

As a follow up to the Bendigo community engagement workshop CSIRO organised a Citizens' Panel held in Melbourne in December 2004 (Katz et al., 2005). Participants comprised citizens from the local community and people from civil society organisations. In the morning sessions, the presentations of six invited speakers were

discussed by the lay panel. In the afternoon, three break-out groups taking the roles of community, industry, and government discussed the issues further and formulated group positions as a response to the question 'What statement will Australia make to the United Nations Forum on Nanotechnology in 2006?'. Participants were, amongst others concerned about ownership and control of emerging technologies, the adequacy of regulation for nanomaterials, and the social divides that nanotechnology might generate. They were in favour of any nano-application contributing to the decoupling of resource consumption and economic growth and they stressed the need for democratic accountability and transparency in science and technology research and development. CSIRO used the findings of the Citizens' Panel and the Bendigo workshop in developing recommendations for nanotechnology research and future social research around nanotechnology.

The same year the Danish Technology Board made a qualitative survey among Danish citizens. This exercise was aimed to explore public participants' attitudes toward nanotechnology and to stimulate public discourse. The 29 participants in this citizens' nano conference were ordinary people from the Copenhagen area without any knowledge in nano-science and nanotechnology. They were sent a preparatory document prior to the event. At the conference itself two introductory speeches from scientists made the citizens further familiar with the topic and enabled group discussions afterwards. The three-hour event closed with participants filling in a questionnaire. Their responses in the discussions and in the questionnaire revealed a general positive attitude toward nanotechnologies, but also the wish to increase research on risks and ethics. Research dealing with prolongation of human life and nano-enabled improvement of consumer goods was met with opposition. The Danish research ministry used the results from this process in elaborating its plan for research on nanotechnology and nano-science published a few months later.

In the following year, the Nanojury UK was established (Gavelin et al., 2007). Initiated by Cambridge University Nanoscience Centre, Greenpeace UK, the „Guardian", and the Policy, Ethics and Life Sciences Research Centre (PEALs) of Newcastle University this public

engagement exercise aimed to influence policy-making by systematically building and articulating a public opinion on the matter. 25 randomly selected citizens formed the jury, which was accompanied by a multi-stakeholder oversight panel monitoring balance and fairness of the process and a scientific advisory panel ensuring proper presentation of evidence. The oversight panel recruited the experts ("witnesses") that informed the jury on the relevant matters. During the first half of the process (eight evening sessions of two and a half hours each) the jury explored issues of their choice (young people, social exclusion, and crime in the local community) and in the second half (ten sessions of two and half hours each) it focussed on nanotechnologies. The last few sessions were dedicated to writing recommendations on the future development of nanotechnologies in the UK. The recommendations, each indicating the level of support by the jury, were presented to an audience of policy-makers, researchers, and journalists.

Amongst others, the jury calls for more openness on public spending on nanotechnology research, that publicly funded research focuses on solving long-term environmental and health problems, and that all nano-enabled products are tested for safety and properly labelled. As regards the outcomes of the Nanojury Doubleday & Welland (2007) conclude that this public engagement exercise, on the one hand, fed into a wider process of policy learning from public dialogue on nanotechnologies. The British Nanotechnology Engagement Group (NEG) collected evidence from engagement projects such as the Nanojury and reported its findings to the UK government in 2007 (Gavelin et al., 2007). On the other hand, the process made the scientists involved more conscious about the wider social and political contexts for nanotechnology research.

The Madison Area Citizens' Conference on Nanotechnology held in April 2005 represents the first major public engagement exercise in the United States (Kleinman & Powell 2005; Gavelin et al. 2007). It was organised by the University of Wisconsin's Center on Nanoscale Science and Engineering and the Integrated Liberal Studies Program. The process took place over three Sunday meetings and involved a group of thirteen citizens from a variety of backgrounds. All participants received background information before the first meet-

ing, which was itself dedicated to the preparation of list of questions about nanotechnologies. The second meeting was held as a public forum where seven experts from a range of different fields responded to the questions of the citizens' panel. The final meeting was devoted to drafting recommendations for government that were afterwards presented to the public at a press conference for selected officials. The recommendations refer, amongst others, to health and safety regulations (e.g., testing of nanomaterials), media coverage and information availability (e.g., data base, product labelling), research and research funding (e.g., increased funding of research into social and ethical implications), and public involvement (e.g., effective mechanisms for citizen involvement in nanotechnology policy development). Whether concrete action has been taken on the recommendations remains unclear (Gavelin et al., 2007, p.123).

Second Generation of Deliberative Processes on Nanotechnology

One year after the American citizen conference, the German Federal Institute for Risk Assessment (BfR) conducted a "Consumer Conference on the perception of nanotechnology in the areas of foodstuffs, cosmetics and textiles" as part of its risk communication activities. The consensus conference provided a consumer vote containing recommendations on how to deal with nanotechnologies in the selected domains (Zimmer et al., 2007, 2008). The group of 16 citizens was introduced to the subject by background material disseminated prior to the first meeting and at two preparatory weekends by lectures and discussions. Based on these inputs the lay panel was asked to prepare a catalogue of questions on consumer-related aspects of the application of nanotechnologies in foodstuffs, cosmetics and textiles. In parallel, the group chose experts for the public hearing from various stakeholder groups (science, associations, public agencies, industry). After this hearing, the group prepared its vote in private deliberations. The next day, the vote was presented to the public and handed over to representatives of the government and civil society organisations.

The vote calls, amongst others, for comprehensible labelling, clear definitions, terms and standards for nanomaterials as well as

for more research into the potential risks before nanotechnology is used to a larger extent in consumer products. The vote names foodstuffs as the most sensitive area for the use of nanomaterials. Regarding the use of nanotechnology in cosmetics and textiles, however, the consumers felt that the already foreseeable benefits clearly outweighed potential risks. The BfR took a number of initiatives to disseminate the consumer vote among decision-makers. They presented the vote on scientific conferences, at the German "Nano-Kommission" (a multi-stakeholder board), at the consumer committee of the German Bundestag, at Federal and regional authorities, at industrial associations, and at the European Food Safety Authority (EFSA).

An evaluation carried out after the process arrives at the conclusion that the Consumer Conference was, by and large, a transparent process of deliberation (Zimmer et al., 2008a). Consumers and experts had a clear understanding of their roles and the entire process was made well traceable for outsiders through an extensive press work. It is less clear, however, what – if any - impact the consumer vote had on decision-making in policy, science, and business. The initiators regarded it as a pilot in public engagement and have not conducted a similar exercise since.

The UK Nanodialogues – a project led by Demos and the University of Lancaster – consisted of four experiments in upstream public engagement run in 2006 (Stilgoe, 2007, Gavelin et al., 2007). The first, "People's Inquiry on Nanotechnology and the Environment", comprised three workshop with a group of thirteen east London residents and concentrated on the use of nanoparticles to clean up chemically contaminated land. The second, "Engaging Research Councils", involved citizens, scientists, and research-council staff and aimed to explore and discuss the role of public engagement in research planning. The third one, "Nanotechnology and Development", was run as a three-day workshop in Zimbabwe to see how nanotechnology might help local communities to secure clean water. The fourth experiment, "Corporate Upstream Engagement", was based on a series of four consumer focus groups discussing nanotechnologies in hair-products, oral care, and food. It was run in co-operation with Unilever and tried to explore the potentials of

public engagement in corporate research and development.

For the purpose of this paper, the second experiment is most relevant (Chilvers, 2006, Stilgoe & Kearnes, 2007). It comprised three sessions – two full day meetings and a final workshop for the preparation of conclusions and recommendations. The process started being split up into two groups, one with six full time mothers with children of school age and the other with eight young professionals with an interest in technology, that were merged into one for the second session. In the first session the participants were made familiar with nanoscience, nanotechnology and the role of research councils and prepared questions to be discussed with scientists and experts during the second session two weeks later. The final session suffered from poor showing of lay participants from the previous workshops (4 out of 14). Due the experiment's focus on the early-stage research the recommendations addressed broader issues of science, technology and society. They advocate a clear and easy-to-understand language in public-science dialogues, involvement of the public at all levels of the research process and intensification of public engagement on nanotechnologies. The evaluation of this second experiment of the UK Nanodialogues concludes that the process did not meet the initial expectations about encouraging public engagement and in delivering final recommendations. "Rather than its potential to shape future directions in nanotechnology research per se, it seems that the real value of this experiment lies in its possible influence on learning and reflection within the Research Councils (and other scientific institutions) about the role of public engagement in shaping research agendas in nanotechnology (and other areas of science)" (Chilvers, 2006, p.11).

In Switzerland, a major process of public deliberation on nanotechnologies was the publifocus discussion forum on "Nanotechnology, Health and Environment" (Rey, 2006). It was organised by TA-SWISS (Centre for Technology Assessment), which is a publicly funded body for the assessment of emerging technologies with an explicit record in participatory methods, and funded by the Federal Office of Public Health (FOPH), the Federal Office of the Environment (FOEN) and the Zurich University of Applied Science Winterthur (ZHW). The discussion forum aimed to explore how citizens perceive nanotech-

nologies in the context of health and environment. The publifocus consisted of four focus group discussions with citizens (53 in total) carried out in different regions in Switzerland (Winterthur, Bern, Lausanne, Lugano) in September 2006. The groups were recruited so as to cover both sexes and different occupations, educational levels, and social and political interests. Each discussion group was four hours long and started with introductory talks from two scientists covering a technical and societal perspective on nanoscience and nanotechnology. After these presentations the participants discussed the topic in two one hour discussion blocks. Right after the event the participants filled in feedback forms that were used for evaluation purposes. The main outcome of the process is a report by TA-SWISS (Rey 2006), the findings of which were fed into nanotechnology policy-making, particularly at FOPH and FOEN.

In all discussion groups hopes as to the potentials of this new technology, e.g., in medical and environment-related applications, outweighed reservations. Most concerns were articulated for nano-applications in foodstuff. Moreover, all participants shared opposition to non-transparent sales strategies and were concerned about the fact that they already might have bought nano-enabled products unknowingly. Hence, the majority expresses a demand for product declaration and labelling, at least for products that contain engineered nanoparticles. The discussion groups also revealed that in their assessment of new technologies people make reference to previous experiences, such as asbestos and ultrafine dust as regards possible risks or ICT as regards possible benefits from new technologies.

The National Citizens Technology Forum, conducted in the United States in March 2008 and funded by the U.S. National Science Foundation, was a deliberative process simultaneously run across six different sites in the United States - New Hampshire, Georgia, Wisconsin, Colorado, Arizona and California. It was initiated by the Centre for Nanotechnology in Society at Arizona State University (CNS ASU) and co-ordinated by collaborating partners at North Carolina State University (Hamlett et al., 2008). The process aimed to generate informed, deliberative public opinion about how to manage technologies for human enhancement, to demonstrate that non-experts can

come to informed judgements on complex issues if they have access to adequate information, and to provide a good example in public engagement that may help ordinary citizens to voice their interests and contribute to shaping public policy. There is no information available yet as to what extent these goals have been accomplished.

At each of these sites, panels of lay citizens - roughly representative of local demographics - were recruited to discuss, debate and give recommendations on converging technologies for human enhancement, i.e. nanotechnology, biotechnology, information technologies, and cognitive science (NBIC). Since these technologies have not yet delivered a wide range of commercial applications, the process addressed an early stage of technology development. The Citizens' Technology Forum involved a total of 74 citizens completing questionnaires about their knowledge and views on these technologies both before and after the process, reading prepared background material, discussing and debating what they saw as the important issues, formulating and asking questions of invited experts in the field and developing a final report with recommendations for policymakers on how to manage these new technologies. There were face to face meetings within the individual groups on the first and last weekends of the month while interactions across the different groups occurred in 9 two-hour online sessions held throughout the month. Researchers from a university at each location served as coordinators and facilitators for the individual groups. The lay citizens received $ 500 upon completion of the process.

In this deliberative process, all groups shared concern over the effectiveness of regulations over NBIC technologies and the need for more public information. A large majority advocated greater importance of therapeutic over enhancement research, careful monitoring of such technologies and the development of international safety standards for them, and a formal inclusion of ethical considerations into decision-making for NBIC technologies. Hamett et al. (2008) conclude that "average citizens want to be involved in the technological decisions that might end up shaping their lives. Citizens remain strongly supportive of research that might lead even to transformational technologies, provided that reliable information about and attentive and trustworthy oversight of their development exists.

Such information and oversight should not be restricted to environmental health and safety but should include social risks such as equity, access, and civil rights. With the appropriate information and access to experts, citizens are capable of generating thoughtful, informed, and deliberative analyses that deserve the attention of decision makers".

Conclusions

The main insights of the review of all these exercises in public engagement in the domain of nanotechnologies can be summarised as follows:

There is a wide spectrum of organisations driving public engagement on nanotechnologies, such as academia (universities, research institutions, etc.), policy consultants and policy advising research bodies, professional engagement facilitators, public authorities, research councils, etc. The initiators show varying scope in their decision-making – from informing the general public and/or stakeholders to funding research – which, of course, influences the potential impacts of the deliberative process.

There are different purposes on which deliberative processes are enacted. It can be about a general identification and assessment of public attitudes towards a certain technology, about experimenting with a new form of public dialogue in order to learn about its potentials and shortcomings, about informing a specific decision, e.g. on research funding, from a citizens' perspective, etc. In some cases the idea of experimentation with novel forms of public engagement was important. Hence, the question of how the process can be organised in an appropriate fashion comes into the focus. This reveals that public participation and deliberate processes actually do not follow a given format. Rather, different forms of deliberate processes are used: from a two hour card game on nanotechnologies, one evening events, focus group discussions of three hours length to processes running over half a year with three weekends (face to face) and interaction between the meetings. Accordingly, there is a variety of tools employed to stimulate interaction between participants, such as working groups, public hearings, plenary discus-

sions, presentation plus questions and answer session, scenario techniques, card games, etc.

The results of the deliberative processes reviewed are numerous: the direct and tangible ones encompass votes, recommendations, reports, etc. The indirect and intangibles ones are learning of participants: awareness and sensitivity with respect to the chances and risks of nanotechnologies; learning on how to manage and employ deliberative processes; building trust into public risk assessment and management; etc. The actual impact(s) of the depicted deliberations, however, are difficult to assess due to a lack of data; a lack of goal specification and a lack of (information about) dissemination activities. If policy-makers are not or only loosely linked to the deliberative process the actual impact on (their) decision-making is obviously very small. This appears to be the case in particular for deliberative processes driven by academia (e.g., US National Citizens Technology Forum). Hence, a prerequisite for a significant impact would be a description of a clear avenue on how the deliberative process is going to influence policy-making; often one encounters a lack thereof.

Nanoplat

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The main idea behind this Support action is to develop a platform for deliberative processes on Nano-science and Nano-technology (NS&T) in the European consumer market. Nanotechnology products are now reaching the consumer markets within a large number of branches. As of August 2008, the nanotechnology product inventory has grown by nearly 279% (from 212 to 803 products) since it was released in March 2006. Personal care, clothing and cosmetics products top the inventory at 153, 126 and 115 products, respectively.

The positive visions for nano-sciences and – technology are apparently without limits. This is especially the case within medicine and bio-nanotechnology, but similar visions are also found for energy, ICT and materials for the consumer industry. According to these visions nanotechnology will have a qualitative innovative influence on the production processes, energy and material use, information and communication systems and – after a while – a substantial influence on the everyday life of individual consumers and households. We might get cheaper, stronger, lighter products, which means that in contrast to the previous history of technology, nanotechnology might combine economic growth with a reduced consumption of materials (COM 2004: p. 38)

At the same time we can observe scepticism along two dimensions. The first dimension is linked to the lack of knowledge regarding both environmental and health risks of the new nanotechnology materials. Secondly, nanotechnology also raises more fundamental questions on the relationship between man and nature; and ethical, political and even religious dilemmas are put on the public agenda.

We will concentrate on deliberative processes concerning human and environmental safety, ethical and moral dilemmas, and perceptions of risks and responsibilities as revealed through a focus on the market interfaces across the value chain of goods and services. That is, at the points of intersection between the sphere of production on the one hand and consumers on the other, where we believe research on the ethical, legal and social aspects (ELSA) of nanosciences and nanotechnology has to date been neglected. We will argue for the importance and relevance of this perspective within the development of deliberate democracy in Europe. This is a support action, with the main goal to stimulate the deliberate dialogue in Europe and beyond, and give scientific support to the stakeholders responsible for this dialogue. Thus, we have formulated our objectives in the following way:

* Evaluate selected deliberative processes in Europe, both at the EU and national level. These evaluations will both have a general NS&T perspective, but will concentrate on the value chain of consumer goods and services.
* Identify the needs and interest of relevant stakeholders along this value chain, especially focusing on producers, consumers, NGOs and the civil society.
* Develop a deliberative and science based platform for a stakeholder dialogue in Europe and beyond in this area. The main elements of the platform are:
  - o a) the content,
  - o b) the participants,
  - o c) the physical and technical solutions and arenas and - at last
  - o d) the responsibility for a permanent platform.
* Formulate Recommendation for research and political actions.

The work packages of the project will more or less mirror this structure. We will combine desk research, qualitative interviews and workshops to meet the challenges of these objectives, where the main task is to develop and sustain a deliberative platform.

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A platform for further deliberative processes.

The following part will present the key concepts retained by the Nanoplat consortium to define a permanent deliberative platform on NS&T. It will briefly present the pilot experimentation conducted on the theme of "Food and nanotechnologies", discuss the results obtained and draws recommendations on possible improvements.

A semi-directed online deliberation among production-consumption-governance actors.

An independent promoting institution

The review of recent deliberative process made by the consortium shows that whatever form assumed by the deliberative process, the role of the promoting institution is key to ensure engagement and information of the participants, proper implementation of each steps of the process with a required neutrality and independency from active players in NS&T field.

The platform is then activated by an independent third party which role is to take the initiative of the process, to define the framework of the deliberation, to recruit the participants and monitor the process. The Nanoplat platform supports these purposes but it will always require a 'moderating independent institution' to bring the deliberative process forward and represent a trustable and reliable party to conduct these tasks in the eyes of all the stakeholders concerned by the deliberation.

◀ Beta version of the Nanoplat online deliberative plaltform.

An enlarged discussion among stakeholders

The initial intention of the Nanoplat research project was to facilitate a form of deliberative process between the various players involved in the defining, producing and commercialising a particular class of goods based on NS&T and having thus the concrete power to influence the sector. The interviews conducted in different professional sectors on current deliberation practices show on the one hand that this strict focus on a particular product value chain tends to overlap with already on-going normal provider/client relationships and will interfere till a certain extend with business to business strategic discussions covered with confidential agreement.

On the other hand it shows that the platform should focus on promoting deliberation between a larger share of stakeholder including authorities responsible for the regulation of the focus sectors, professional associations often active in anticipation of the regulation, NGO watching consumer interests, etc.

The deliberation may also enable broader dialogues between stakeholders of similar professional sectors in different European countries as well as exchanges between different professional areas that may benefit from mutual experiences in approaching potential conflicts, anticipating regulation or bringing forward constructive deliberations.

A continuous permanently regenerated process

From the participant side, participation to a deliberation is demanding in time and efforts in particular for non-expert to acquire and maintain an updated level of knowledge.

From the promoting institution side, keeping a level of interest among participants requires a continuous stimulation of the debate similar to the moderation of a round table: feeding the exchanges with renewed points of view; focusing burning issues and ensuring that all consistent groups of stakeholders are aware of the deliberation and have access to it.

The notion of a permanent deliberation process should therefore be understood as a continuous and regularly regenerated process.

A progressive involvement in social computing tools

From the review of a sample of deliberative process made by the Nanoplat consortium it is reasonable to think that feasibility of a permanent deliberative process at a European scale implies the implementation of an online-based platform. The use in the platform and in particular of social computing-like tools online facilitate deliberation between remote participants in different European countries and support the different organisational and monitoring tasks from the institution promoting the deliberation. Till a certain extend, these tools may enable deliberation process where participants are carrying out autonomously the discussion. But observation of the development of social computing phenomena shows that this situation can only be observed after a certain time of existence and development of the platform. In particular it should raise interest among a critical mass of users and demonstrate benefits for them at the level of the effort needed to involve in the platform.

A two steps deliberation format...

The Nanoplat consortium proposed to take Cohen (1989) four criteria for an ideal deliberation as a starting point to transpose the deliberation as an online tool. We record here these four criterias:

- It is a free discourse; participants regard themselves as bound solely by the results and preconditions of the deliberation process;
- It is reasoned; parties are required to state reasons for proposals;
- Participants in the deliberative process are equal;
- Deliberation aims at rational motivated consensus.

The setting of the platform should also meet the necessary constrains of the proposed deliberation:

- Enabling deliberation exchanges on a European basis;
- Involving high level experts and professional with strong time constrains;

Nanoplat

090529_Session3

Published by admin on May 7th, 2009

11:29:45 <21_ngo> 7_authority: It is quite reasonable that RA slows down developments with GMO and novel foods?
11:30:04 <7_authority> 5_academic has a good point of view, we agree
11:30:41 <Moderator_3> **5_academic Who should stop?**
11:31:44 <7_authority> Cooperation is really important, both parties together should think about it
11:32:06 <1_research> are you talking about stop in the sense of a moratorium?
11:32:35 <5_academic> Good question ! Difficult, but regulatory bodies could handle discussions on resraech and release of products with sanctions in the closet...
11:35:36 <5_academic> probably the "because we can" culture need som guidance and slowdown... ???
11:37:13 <21_ngo> Concepts like "Stop" and "moratorium" dosen't have much value unless we are specific about what exactly should be covered by such initiatives. The more organic and natural parts of nano like emulsions, could not easily be out of the question just like that?
11:37:49 <22_business> 7_authority: Co-operation is of course a good concept, but: most development projects are technicologically very demanding. Wouldn't is be very inefficieint to add legal representatives at an early stage? It seems more adequate to have the legal requirements in place before-hand.
11:39:42 <Moderator_3> **Imagine that mandatory labelling of nanofood becomes the norm worldwide. Would it be a good solution?**
11:39:50 <5_academic> agree, our words should not be to conflict and politics infected...
11:42:03 <5_academic> Mandatory labelling, at least it is a nice thought-experiment. It would create public debate and a long chain of side-effects that are mainly positive..
11:42:17 <1_research> labelling makes the users able to take informed choices, and can in this respect be useful
11:42:30 <21_ngo> As always it depends on what should quailfy for such a label, and how. Good information about the contains of a product, eventually also with a description of the purpose of the nano-modification, would be constructive. But not as a substitute for safety
11:43:32 <22_business> 21_ngo: agree
11:44:40 <Moderator_3> **5_academic Would you specify these positive side effects?**
11:45:05 <1_research> one challange in labelling is if the word nano gives positive or negative assosiations?
11:46:05 <7_authority> I see what you mean, but there are several products on the market already containing nanoemulsions, if these are not regulated, they can abuse with the technology.
11:46:29 <5_academic> Some risks must be handled by regulation, some by negotiation and careful process design, some left to public debate, and some left to consumers. The two last willl benefit from labellingg. And the labelling process will make the whole production-and-disposal chain more visible
11:47:07 <Moderator_3> 1_reserch In cosmetics it was used for a while, then they stopped using it..
11:46:52 <7_authority> mandatory labelling is extremely necessary. At least the types of nanomaterials should be written on the product
11:50:14 <5_academic> Labelling creates transparency and public debate which we need. If consumers are worried, they should be informed. If the worry is irrational, some should tell them... And the process of labelling will have to make the chains clear and documented, and that has its own value.
11:51:43 <21_ngo> 5_academic: Your summary is good about where labelling is helpful compared to "hard regulation". And when "risky" products are allowed on the market because they are seen as a necessary evil, good consumer information should be mandatory
11:52:28 <Moderator_3> **There are several nano related voluntary codes created by the industry, asociations, NGO's (e.g. Nano Risk Framework) and the European Commission created one (Code of Conduct for Responsible Nanosciences and Nanotechnologies Research). Do you heard about any of these? These codes aim to provide guidelines for risk assessment/management and communication. What do you think about these "soft law" approaches?**
11:52:48 <21_ngo> By the way, such risky procucts would be those involving silver as an antimicrobial, for instance.
11:54:21 <1_research> in particular, the EU code for responsibility is rele
11:54:47 <1_research> in particular, the EU code for responsibility is relevant for research
11:54:48 <7_authority> We think these are good initiatives, but as they're optional, question if they will be really used in practice. Hard laws are needed.
11:55:40 <5_academic> I am growing more positive to soft regulation, it easily makes a governance system including producers, authorities, consumer groups and environmentalists etc
11:56:11 <1_research> relevant is also the UK resposible nanocode for business from 2007
12:05:02 <Moderator_3> **- Dear Colleagues! We have reached our time limits, so I must close today's discussion. In the name of our research consortium I would like to thank all of you for devoting your time to our pilot study. Thank you for your efforts! You will be informed about our findings and we will send you an e-mail. We are looking forward to your continuing engagement.**
12:05:20 <21_ngo> Thanks for the discussion
12:05:25 <22_business> Thanks to you too! Have a nice day!
12:05:29 <7_authority> Thank you for this discussion, it was interesting to hear your views.
12:06:40 <Consortium_2> Thankyou all for a very interesting discussion, from Nanoplat consortium member, University of manchester, UK
12:10:18[1] <Moderator_3> /users
12:10:18[2] <*Users*> 12:10:18[1] Active users: 21_ngo, 22_business, 5_academic, 7_authority, admin, Consortium_13, Consortium_2, Consortium_4, Consortium_5, Consortium_6, Consortium_7, Consortium_8, Consortium_9, Moderator_3
13:17:42 <t0007> I think it's necessary to invite citizens whom have needs to be address. Like told; diebates, obesities mostly. Since ordinary citizens' comments might not fit on purpose. I'm sure everyone has say on it, but needy community would be much more interesting though.

Post

Type "/users" to see a list of users viewing this tribune.
The maximum length for a message is 1200 characters
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- Providing intensive and dense occasion of interaction meeting both the availability limitation of participants and their expectation in getting benefits form their participation;
- Limitation of the side tasks of organisation, coordination and processing of the information provided;
- Keeping a light overall process in terms of time requested and financial costs induced to ensure that proper deliberation could be engaged at any moment when it is necessary.

Taking these constraints into consideration, the proposed deliberative process supported by the platform is based on two steps:

Kick-off sessions

The purpose of the kick-off sessions is to prompt the emergence of key issues involving a reduced circle of experts in a quick interaction process.

These sessions are based on short online conference and a chat-like tool (regular key-board based - no audio or video) allowing short written fluid exchanges between 5 to 10 participants. The purpose of such setting is to slow down exchanges between potentially antagonist parties on burning subjects. On the one hand, the very fact of having to type a text to interfere in the discussion induces participants to a more composed attitude. Body languages and tone of voice doesn't appear and moods appear only through inflexion of the written formulation. On the other hand, the written contributions require by essence more rational thinking. Texts are perceived as less volatile and tend to involve their authors.

All together, the affordance of these interaction settings is to induce participants to a more reasoned debate, balancing the dynamic of a round table with the argumentation of the written paper and meeting the second criteria of Cohen. The end result is a 8 to 12 pages written dialogue that remains available online as an evidence of the exchanges and a ready to use material to prepare a synthesis for the next step.

Open Revision Session: Nano and Food: Questions of ethics

>To revise this summary, just click on edit, modify the text and save<

Nano and Food : Questions of ethics : Kick Off Sessions summary

The positive visions of nanotechnologies within the food sector is linked to nutrition, functional food and increasing the life-span of processed food. It will be possible to keep the food products fresh longer in both shops and households and this will reduce the waste substantially. The quality of the nutrition will be improved and this may contribute to fight obesity and a number of diseases. However, do these visions also have ethical aspects that are relevant for the development of emerging nano-technologies for the production, distribution, consumption and disposal of food? Questions that go beyond risk evaluation and the sustainable challenges, discussed in other parts of the document? As we see it, it is possible to discuss ethical questions along three dimensions. The first is linked to the increased shelf-life, the next to the functional food discourse and the last to discussion about power along the value chain. All these three dimensions have also been relevant for GMO-food discourse.

For some people increased shelf-life of processed food represents a positive development, and as long as this life-span is kept within reasonable time limits most people will accept this technology as an improvement. However, for other people this is the real horror scenario. You completely decouple the relationship between production and consumption; seasons don't matter anymore. It frightens some people, but more important is that many people don't like the story behind this way of produce food. It is not their dream society. This is a parallel to the GMO-food discourse; it changes the world in a way that is not supported by large consumer groups. Fruits and vegetables that last for months seem not to be their ideal because you destroy the traditional way of production

For the functional food dimension, we will witness some of the same ethical arguments. Food and medicine belong to two different arenas, and the mixture is problematic. It is easy to se the advantages; the nutrition level will increase and be kept over substantial life-span. On the other hand, food production will not be met by the same control regimes as in medicine development. The last discourse is related to the power along the value chain. First of all there are reasons to believe that this development will favour large multi-national companies, compares with SMEs. It will also strengthen the power over the industry, compared to all other actors in the value chain: primary producers, retailers and consumers. At last, even though the vision that nano-food may be a fruitful potential for consumers in the Third World, we may also witness the opposite development. The Third world will not have resources to use the new emerging technology, and who will then pay product development for their needs, the socalled nano-divide.

There are also another dimension to add that is health. It must be considered that if it is harmful for the human health while we increase the shelf-life, life-span of the food or do the other things. As a result foods are directly related with the human health and the chemical structure of the foods is changed with nanotechnology. It must be investigated that if nanotechnologic foods that are developed newly have any side effect for human health in the long run with clinical trials. Also it is the right choice to control the nanotechnologic food development process with regulatory policies like medicines.

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Open revision sessions

The purpose of the open revision session it to facilitate the emergence of an agreement within a larger circle of stakeholders.

This second type of sessions is based on free access online revision of synthesis emerged from the kick-off sessions. The process is based on a wiki-like tool displaying the synthesis and offering to visitors the possibility to edit them and substitute the former version by a new one. The tool offers also the history of all previous versions, the possibility to restore them, to compare between different version and evidences also changes that have been made.

The purpose of this setting is to foster the achievement of a consensus between divergent points of view and interests. The proposed synthesis already tends to propose a possible balanced/reasonable position to have more chances to meet all stakeholders' agreement. For visitors, the effort required to disagree is higher than to agree: the editing of an already structured text need some time and attention and only consistent controversy will be sustained. Small divergences will induce only fine-tuning of the text or even acceptation as it is. Polemic attitudes and ego valorisation are discouraged.The affordance of these interaction settings is to facilitate consensus meeting the fourth criteria of Cohen.

The log of the visits allow the moderating institution to follow easily the number and type of visitors and to acknowledge their agreement to the synthesis whatever if they make changes in the synthesis or if they simply read the text and approve it.

The final result is the last version of the synthesis agreed by all participants reducing drastically the monitoring work whatever is the number of participants.

Two other important settings of the platform have to be mentioned to show how it meets the two other criteria of Cohen.

Invited visitors

Stakeholders invited to take part to both kick-off and open revision sessions are invited. The invitation described the conditions of the

exchanges in generic terms without mentioning any time the identity of the stakeholders and so leaving them free, apart from the actors mutual influence and then meeting the first criteria of Cohen.

Anonymous participants

Participants receive a specific login and password but their identity is not disclosed. Their login only state the category of stakeholders they belong to facilitating interpretation and mutual understanding during the exchanges and meeting the third criteria of Cohen.

A flexible toolkit for deliberation...

Deliberative processes reviewed by the consortium were assuming various purpose, forms, lengths, sizes, etc, showing the necessity to adapt the process to the specific goals and contexts...The platform is therefore organised as a set of tools that may be used in different ways, orders and intensity to enable implementation of different deliberative processes.

The online platform is therefore proposed as a structured toolkit available to implement customised deliberative processes (figure 1). In particular, the deliberative process toolkit offers the following tools proposed here in the order they have been thought for a standard use:

A focused library

The platform offers a limited library based on a theoretical discussion of the notion of deliberative processes and a related selection of background documents and references accumulated by the consortium provides a minimum working framework reference in term of deliberative processes.

A catalogue of deliberative processes

A series of cases studies documented by the corsortium show a panorama of various recent experiences in terms of form, duration, size, purposes, etc. In order to facilitate access, browsing and comparisons between processes in the catalogue, 3 levels of description of the processes are progressively accessible online: a diagram positioning the different processes according duration and number of participants involved; an intuitive visual mapping representing the major characteristics of each process in terms of inputs, profiles of the process and outputs provided; a complete written description of the case study of the deliberative process.

A support for investigation of production-consumption-governance actors

Distant short phone interviews made by the consortium to investigate current experience of deliberative processes among various stakeholder groups in different professional sectors and European countries represent a light and useful preparatory phase before approaching a deliberative process focussed on a particular topic.

The experience grained during the Nanoplat project has been made available online through a series of tips and advices on recruitment of candidates for the interviews; good practices in the moderation of the discussion; realisation of a semi-directive interview guide; sample of interviews realised with stakeholders of different groups and from different countries.

Briefing documents

The first steps goal is to ensure that sufficient basic information on the topic is shared among the participants as well as promoters of the deliberative process. A series short briefing document and a selection of related reference publications are made available on the platform. Since deliberation is foreseen between already informed stakeholders of a professional sector, only light information is provided. It is to be noted that these series of short briefing documents plays a role of a first level of consensus between the involved

stakeholders as agreement on the background material should be regarded as a first step towards convergence.

Participants list

A list on a spread sheet allows the institution promoting the deliberative process to follow the different level of involvement of the invited participants as well as to match their anonymous login with the logs of the visits they make on the various parts of the platform.

A kick-off chat tool

As it is described in the previous paragraph, this tool allows small number of participants from various stakeholders groups and different countries to exchange through a written discussion and raise key topics to deliberate on.

A revision wiki tool

Again as developed above this tool allows engagement of larger number and variety of stakeholders to review and agree a synthetic consensus as result of the deliberation.

Pilot experimentation of the platform on 'Food & nano'

The Nanoplat consortium run a light pilot experimentation of the platform focused on theme of Food & Nano. Objective was not to be exhaustive on the topic but rather to experiment the platform, explore its potential and point possible improvements.

Briefing Documents on the topic have been elaborated to introduce to the semi-directed online debates. They give the theoretical framework and synthesise the main issues in order to facilitate discussions and give an equal knowledge among kick-off sessions participants.

Two kick-off sessions have been organised inviting 4-8 production-

consumption-governance key-actors to take part to an online deliberative process. Invitation mails outline how the debate will be organised, propose a two-hours meeting date and require from each of them to send back on the focus topic some key issues they would like to debate.

Participants confirm their interest to take part (Cohen criteria of free participation). They receive an answer by mail stating which kind of stakeholders will take part to the debate (anonymous, just stating roles) and what kind of questions will be debated (6-8 cluster questions from all questions received). Participants receive also a personal usernames and passwords identifying their role but not their personal identity i.e. 1_business 1; 2_research; 3_ngo; 4_authority, etc... (Cohen criteria of equality between participants). Participants were invited to check if they can log on the platform and familiarise with discussion tools before the discussion session.

Guidelines and rules of participation were made present to the participants in particular to ask participants to systematically justify ("give reasons for", "properly explain") their answers (Cohen criteria of reasoned discussion).

During the 2 hours meeting, the participants log on the platform with consortium participants as moderator. The 6-8 issues proposed by the participants are debated for 10-20 min each. After the session a one-page synthesis on each of 4 initial issues is made by the consortium.

Each of the synthesis for the 4 emerging issues were posted on the Nanoplat platform via a wiki-based tool. Invitations were sent by mail to the kick-off session participants, to the observers of the session, to interested stakeholders that were not available for the kick-off session and in general to a larger range of production-consumption-governance actors of the focused topic. In total 60 invitations have been sent proposing to check each of the 4 issues and eventually to revise the related synthesis. Invitations also explained that the synthesis will be made public to incentive participation.

The consortium monitors the revision process, prompting participation and avoiding too radical interventions. 46 persons have been invited to take part and 15 have effectively logged on the website

Will improved information and traceability help us or confuse us?

Do we want ‘everlasting freshness’?

over a one week period. A level of feedback of 33%, particularly high especially considering the very short time left between invitations and the sessions to get time from high level experts and professionals allows to considerate that the synthesis have been validated (Cohen criteria of reaching a consensus).

This light experimentation was too short to draw in-depth conclusions on the platform. More piloting on a larger sample of stakeholders and different topics should be run to confirm the first results. However, it is clear already with this experiment that an online deliberation platform is a promising solution to promote a regular dialogue between various players on the European NS&T scene and on technology development in Europe and beyond.

In particular:

- the content of the debate on the topic of nano & food and the design of the interaction seems to confirm the Nanoplat platform provides consistent support to facilitate deliberation between a wide range of stakeholders from different background and across different countries;

- the level of participation of the experts obtained and in comparison the relative light effort to engage them in the experimentation provided by the consortium also tends to confirm that a permanent deliberation process on NS&T at a European level can be conducted by one or more an independent institutions on a permanent basis and at a relatively low cost.

Critical issues have been also identified to enable this permanent deliberative process from the current results of the Nanoplat research project:

- the current beta version of the online tool require to be further developed into a more stable, robust and user-friendly infrastructure;

- a mechanism of dissemination to give visibility to the on-going debate should be integrated to the platform. In particular, a process of translation of the experts conjectures into potential tangible offers on the market has been further developed by the consortium to engage with large public (see box on Future Food Dialogue Project);


Will improved sensing technologies
help certifying food quality ?
ORGANIC FOOD TESTER
not organic
acceptable


Will extended preservative technologies
reduce food waste?
LONGER
SHELF LIFE
PREVENT
FOOD WASTE

• a large number of online initiatives from new products surveys to consumer information and public forum are already running on Internet and building synergies with them is key to disseminate debates supported by the platform.

As a potential spin-off of the Nanoplat prototype of the deliberative platform and pilot experimentation of nano & food, a follow-up project called Future Food Dialogue Project has been developed in collaboration with the Responsible Nano Forum in UK.

The project objectives are:

• To develop a compelling, yet balanced and rounded approach to presenting the use of technology in food in a consultative though engaging format

• Through a consultative development approach to engage opinion formers to inform our understanding and communication of some of the potential applications of these technologies in actual products as they may appear on the shelves.

• To understand the views, preferences and concerns of the general public in relation to new technologies in food

• To communicate these views widely and thus help ensure that public opinion can make a contribution to the development of technology in food.

One of the deliberation mechanism proposed in the Future Food Dialogue Project is based on a series of photo-realistic future products elaborated from the hypothesis and opportunities open by the progresses of NS&T in the food sectors. These tentative anticipation are not meant as attempt to forecast the future food market but as stimulation material to foster large stakeholder deliberation on both likelihood and desirability of these conjecture. They consist of a mix of serious and naïve, reasonable and provocative hypothesis circulating in the public debate. The purpose of the deliberative debate is to draw tentative lines between realistic futuribles and fuzzy dreams, shared views on expected progresses and speculative or misleading Wonderworlds.

Will extended preservation for fresh foods open up new markets?

Will we be able to manage a ballance diet?

Conclusions: the future of deliberative processes.

In the public discourse on deliberative processes in nanotechnology we have identified three arguments against further development of such processes:

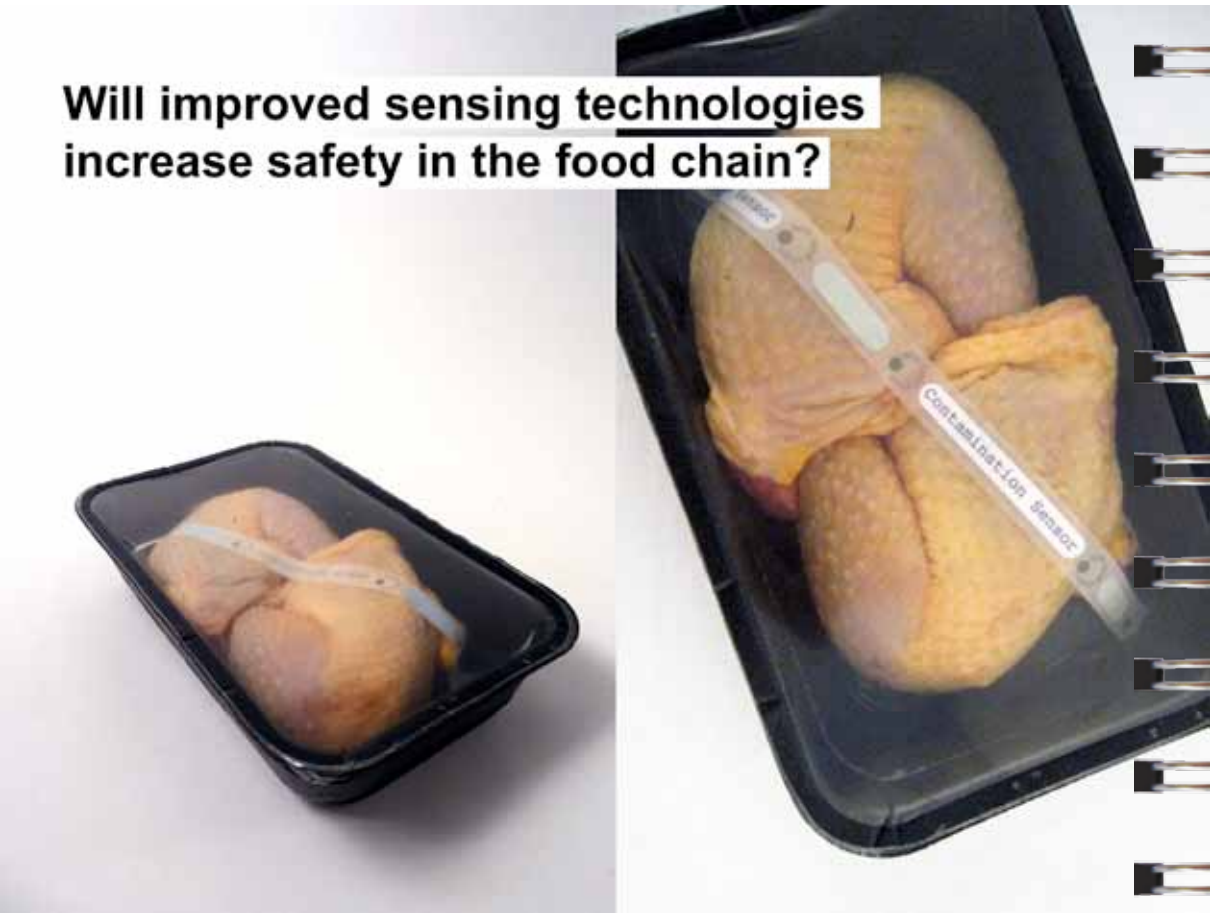
- New processes will not create more knowledge, it will more or less be more of the same
- An increased use of deliberative processes will raise public expectations, and these expectations will not be met by occasional processes where nobody have a more permanent responsibility
- An increased use of deliberative processes will be a treat to the numerical democracy. They move the power of decisions from governmental institutions to non-representative processes not designed to make political decisions.

In this concluding chapter we will discuss these three objections to deliberative processes.

More of the same? In the overview of selected deliberative processes we have seen a movement from the first to the second generations of deliberation. Besides a difference in points in time at which the processes have been conducted, the distinction between first and second generation deliberative processes on nanotechnologies is most evident in terms of sophistication of the applied methodology.

Second generation public exercises are more elaborated than the early approaches. The second generation processes are also, to some degree, more specific processes. They are dealing more with applications than with the general relationship between science and

Will improved sensing technologies increase safety in the food chain?



Could 'nutraceuticals' replace a balanced diet?

society. The responsibility is moved from the research community to the industry. This also has to be reflected in the third generation of deliberative nano-technology processes. As we see it, the next generation of deliberative processes need to be even more specific. The reason for this is the fact that we not anymore are talking about nano-technology, but about technologies. This means that it is not meaningful, from an ELSA perspective, to carry out general processes.

Secondly, during the last years a large number of "nano-products" are found on the consumer market. In the updated version from the Woodrow Wilson Centre, more than 1000 products are listed. They vary from sports equipments to textiles and from cosmetics to car polish products. This is also an argument for more specific processes, where strategic parts of the consumer market could be a topic. In the Danish citizens' consumer conference from 2004 the participants were not at all interested in the nano consequences for the consumer market; this would probably not be the case in 2009. One important emerging area is nano-food and another related area is nanotechnology for food packageing. However, as innovation takes place, other product categories may soon be relevant.

Unfulfilled expectations? In terms of impact, however, a clear-cut distinction between the two generations is difficult to draw. The lack of respective knowledge is obvious and the link to political decision-making does remains fairly weak.

One of the challenges for the deliberative processes is that they create substantial expectations among citizens, especially among the participants. What will happen with our input? Who is responsible for the voice of the public in the future? This is a real argument because some of the processes are parts of research projects, and the deliberation ends with the project. Others are parts of public programmes, which also close at the end of the program. As an example, the Danish Technology Board carried out deliberative processes or stakeholder involvement in 2004, 2006 and 2008, but involvement of citizens was not the agenda in the other years.

Future deliberative processes have to deal with these challenges. We have established a platform for deliberation of more permanent

Foods as medicines?

When is high tech food fairer or better?

On the other hand we have also seen a new discussion about the relationship between the democratic and deliberative processes. In the public and scientific discourse we have witnessed an increasing scepticism to many aspects of these deliberative processes. Who participates and what is the goal of the processes? Within political science this has relevance for the classical discussion on numerical democracy and corporate pluralism (Rokkan, 1969).

It is possible to identify at least three key challenges for an inclusive, democratic debate and decision-making process on new technology, 1) Knowledge deficit among participants and stakeholders. 2) The discrepancy between visions and commercial products and 3) How and if the outcomes of such debates are brought back into the decision-making processes

The lack of knowledge about nano-technology is also documented in scientific research. This is surely the case for the public in general, but also among political actors and other stakeholders. The consequences are that there are a limited number of voices to be heard in the public discourse.

While the predominant representation of nanotechnology in popular science and the media appears as fiction, relating to micro machines and assemblers (Drexler, 1986; Gibson, 1996; Chrichton, 2002), the presence of nanotechnology in ordinary life today is more about carbon nanotubes in sport equipment, nanoparticles in cosmetics and antibacterial clothing and kitchen equipment. This discrepancy between nanovisons and nano-reality makes it difficult to define a set of themes around which to organise a debate. However, experiences has shown that is it possible to engage public in relatively complicated scientific discourses.

One last challenge is the link to the democratic decision-making processes. Is the deliberative process a part of inputs to decision-making processes, and are the results brought directly and formally back into this process? Or is it more a part of research-projects where the results are inputs into political and scientific discourses, - but not directly parts of formal processes? We find both processes in our sample.

We have witnessed a critique from both participants and organisers

Does it do what it says on the pack?

Tecnology to increase cooking convenience?

character and this platform may be used in future processes. The simple web-tool, developed in NANOPLAT, makes this possible.

Engagement in social computing processes is facilitated when participants may find forms of gratifications. The first level of kick-off sessions assumes the form of a round table allowing participants to debate with peers on a European basis and benefit from the exchanges. The second level of open revision sessions gives access to an up-to-date level of consensus between the stakeholders in place.

These two elements are already promising benefits to foster engagement of the participants. To complete these incentives to engage in the deliberation platform, the Nanoplat consortium proposed to add to the different levels of written synthesis, visual forms of representation showing scenarios that may result form the deliberative process.

The scenarios developed for the platform propose a visual synthesis through the design of some hypothetic products in line with the agreement reached by the deliberative process. They intends to express a balanced position, somewhat challenging compared to the current situation but reasonable and justified.

The purpose of these visualisations is then two fold: On the one hand, it should tease the contributors to the deliberative process facing them with concrete expression of consequences for the future resulting form what they agreed. On the other hand, it should facilitate access to the debate to larger share of stakeholders on the topic translating the debate into the form of concrete products hypothesis.

A treat to numerical democracy? We are aware that there may be a dualism of deliberative processes in general and linked to the development of nano-technology more specific. On the one hand these processes represent increased citizens' involvement in democratic processes. Both in USA and Europe we have during the last decades witnessed several deliberative processes and stakeholder approaches within both gmo- and nano-technology. The Danish Board of Technology developed already in the 80-ties a model for public involvement in complicated technological processes. This model has created legitimacy around similar deliberative processes.

of deliberative processes that it is problematic that the deliberation is not a part of formal political processes. It is easy to understand this critique. On the other hand, when we are talking about numerical democracy and deliberative processes, it is also problematic when the results are brought directly back into political processes because of the diversity of the subject, lack of knowledge, and the biased representations in these processes.

The answer to this critique is that we have to distinguish between the public discourses and the formal decision-making processes. The deliberative processes have given a positive contribution to the democratic discources on science in general and linked to nanotechnology more specific. This represents no treat to democracy, the opposite is actually the case because it increased public involvement and represent a democartisation of science. However, when we move to the formal decision-making, - we have to take all decisions within the framework of thre representative democracy; where one man and one women have one-vote.

To sum up our argumentation. There is a future for a third generation of deliberative processes in the development of nanotechnology. These processes have to be more specific oriented and more closely linked to the decision-making processes. They may gain from using the platform developed within the NANOPLAT project. One of the main challenges in the future is the responsibility for running such processes and independent institutions may take that responsibility. The deliberative processes represent a democratisation of science, and as long av we distinguish between the public discourses and the formal decision-making process, deliberation represent no treat to numerical democracy.

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