

Summary of evidence from Civil Society groups at a meeting with
the nanotechnology working group on 30 October 2003

Comments on this document are requested, preferably by 16 February 2004.

The views summarised within this document do not represent a consensus of the views of the attendees and do not necessarily reflect the final views of the Nanotechnology working group.

Summary of evidence from Civil Society (CS) groups at a meeting with nanotechnology working group

30 October 2003, Royal Academy of Engineering

Attendees:

Representatives from the following organisations

Forum for the future

ITDG

ETC Group

PEALS, University of Newcastle

Patients Association

Demos

(See end of document for all those invited)

Working group

Ann Dowling

Nicole Grobert

Deirdre Hutton

Ray Oliver

Nick Pidgeon

Jonathon Porritt

John Ryan

Anthony Seaton

Saul Tendler

Roger Whatmore

Mark Welland

Secretariat

Sara Al-Bader

Andrew Dunn

Richard Ploszek

Overview

In June 2003 the UK Government commissioned the Royal Society (<http://www.royalsoc.ac.uk>) and the Royal Academy of Engineering (<http://www.raeng.org.uk>) to carry out an independent study of likely developments in nanotechnology and to examine whether nanotechnology raises or is likely to raise new health and safety, environmental, social or ethical issues which are not covered by current regulation. The terms of reference for the study are as follows:

1. define what is meant by nanoscience and nanotechnology;
2. summarise the current state of scientific knowledge about nanotechnology;
3. identify the specific applications of the new technologies, in particular where nanotechnology is already in use;
4. carry out a forward look to see how the technology might be used in future, where possible estimating the likely time scales in which the most far-reaching applications of the technology might become reality;
5. identify what environmental, health and safety, ethical or societal implications or uncertainties may arise from the use of the technology, both current and future;
6. identify areas where regulation needs to be considered.

Details of the study can be found on the dedicated web site <http://www.nanotec.org.uk/>.

As part of the process of gathering evidence for the study the working group had a meeting with representatives of civil society organisations on 30 October 2003. Representatives from 22 organisations were invited, and 6 were able to attend. The following is a summary of some of the main points of discussion. It does not necessarily represent consensus amongst attendees.

Introduction

After introductions around the table, the Chair of the working group outlined the background to the study and the different strands of evidence-gathering that the group is involved in. It was noted that the study, which was commissioned by the Government, grew out of recommendations from the Better Regulation Task Force report published earlier this year. A CS representative suggested that the setting up of the working group was also driven by the desire of the two scientific academies to be seen to be undertaking a listening process, particularly following the House of Commons Science and Technology Committee's criticisms of the lack of public accountability in the UK's biggest learned societies.

Systems of Government

The extent to which the current system of democracy is effective in determining the development of new technologies was discussed. The view from some Civil Society (CS) representatives was that science appears to be uniquely insulated from mechanisms of democracy, resulting in a lack of public participation in the development of technology and therefore a lack of public control of it. The increased control of science by private companies was highlighted by CS representatives as a particular concern. One attendee commented that if the democratic process worked, the specifics of the technology were unimportant. Another thought that in certain areas, for example health spending, the democratic process worked better than in others. A member of the working group enquired as to whether the power of the market and of the consumer to choose would be considered a democratic alternative to a government-controlled oversight process. A CS representative argued that markets were not democratic, given that people with less purchasing power had less rights in a marketplace. This was a particular problem in the Third World.

The global impacts of technology choice were discussed at length, with the feeling that developing countries repeatedly missed out on the benefits of technology. It was argued by a CS representative that, especially since the industrial revolution, technology waves have been driven by those with financial or political power. Because of the lack of accountability of those who develop industrial technologies each successive wave has further widened the gap between rich and poor. Another CS representative emphasised the need to understand how a new technology might replace or displace existing industry. For example, if nanotubes are used in wiring instead of copper, what will happen to indigenous copper mining industry in Peru? The example was given by another CS representative of the situation in Andhra Pradesh in India when the mechanisation of agriculture was introduced. Despite promises of increased standards of living, 20 million out of 80 million of the state's poorest people are likely to be pushed out of their agricultural livelihoods with no alternative employment having been made available. The possibility that this was not necessarily a technological issue but a political one was raised by a member of the working group. A working group member also suggested that the industrial revolution, for example, had led to a general increase in standards of living for everyone, but this was disputed by a CS representative who pointed to the increasing levels of global poverty. The working group maintained that these questions were very broad, big ones for society as a whole, which were outside the remit of this study.

A CS representative suggested that what is needed is a paradigm shift from technology as driving change to technology as enabling change, and for the voice of poor to be represented at policy level. The exact mechanism for achieving this was not explored in detail, but it was agreed that for it to be effective it would have to be global. One suggestion from a CS representative was an international convention for evaluating new technologies. It was noted that these arguments were generic to technological progress and not unique to nanotechnology.

Lessons from GM

It was agreed that there were lessons to be learnt from recent debates about controversial technologies, particularly GM, which could be applied to the nanotechnology case and could suggest new forms of useful deliberation. The CS groups were asked what these lessons might be and made the following points:

- One lesson from GM was that technological progress needed to slow down to keep pace with citizen deliberations and democratic controls, and decision-making. This raises concerns in so far as it appears that there are already 'nano' products in the marketplace. There has also been an injection of funding into nanotechnology, with little evidence that this is linked into societal needs.
- Another lesson was that technology should not be imposed on the public. If the public perceive this to be the case with nanotechnology, this will be problematic, even if this perception is inaccurate (for example, secondary effects of nanoparticles in air).
- One view was that CS groups were forced into taking an extreme view of GM, which led to an unhelpful polarisation and lack of debate. In order to avoid a recurrence of this situation with nanotechnology, a space where a range of stakeholders – scientists, government representatives, civil society groups, industry – can communicate is needed. Some attendees felt that now is a prime time to instigate this process, as there is an increasing desire amongst scientists to act as citizens, and, post-GM, an awareness amongst business of the importance of engagement.

Nanotechnology industry

The perception from many CS groups is that there is a burgeoning nanotechnology 'industry', which is making claims for the transformative powers of nanotechnology. The extent to which there actually exists such an industry was debated at length. For example, if a TV with a 2nm flat screen is produced, and 99.99% of it is made from something else, does this constitute 'nanotechnology'? There are differing views on how close nanotechnology is to the market place, complicated by the fact that nanotechnology is defined in different ways. One estimate from a working group member was that nanomanufacturing is about 10 years away. However, the view from civil society representatives was that there was either an existing nanotechnology industry or that one was swiftly emerging.

This highlighted one of the main difficulties in discussing nanotechnology as a discrete area – it does not have a well-accepted and fixed definition, nor is it one particular technology but cuts across a range of disciplines. One view which had been suggested to the working group in their evidence-gathering was that the area covered by nanotechnology is just chemistry (for example colloid and polymer science, catalysis) and in that sense is not new. However, a CS representative felt that this view is not borne out in the investment press and that it was reminiscent of the doublespeak surrounding GM crops, which were presented to investors as revolutionary and to the public as merely an extension of conventional breeding. It was highlighted by a CS representative that there is a great deal of rhetoric around nanotechnology as a new industry, as evidenced by the NanoBusiness Alliance and the US National Nanotechnology Initiative, or at least as a convergence of interests across lots of different industries. It was suggested that it was this all-encompassing characteristic of nanotechnology that raised concerns. (Concern, for example, that a company could own a patent on carbon nanotubes which would then be used across pharmaceutical industry, aeronautics etc, which may create a reliance greater than in the case of GM. However, it was noted by a member of the working group that there are lots of area of technology that don't rely on patents, and that this could be seen as a political question.) It was acknowledged that the fact that a large investment of money and policy time has been devoted to the nanotechnology area raised alarm bells in the civil society groups. The importance and difficulty of separating reality from hype in nanotechnology was supported by all present.

A CS representative suggested that the positive potential of nanotechnology ought to be considered too - nanotechnology may provide some opportunity to disrupt the trend of only rich nations being able to afford

and thus control technology. A member of the working group gave the example here of plastic transistors which are a fraction of the cost of conventional ones.

Public perception and scenarios

A CS representative commented that the RS/RAEng faced a challenge in attempting to assess the public response to and perception of nanotechnology. A member of the working group said that the process by which this would be done involved two workshops, run independently by a market research company, and a web forum in early 2004. Anyone is free to send in comments via the website at any stage of the study. In response to the question of whether this is sufficient resource, the working group was keen to stress that this aspect was only a small, but important, part of its work, helping them to answer one of their six terms of reference – ‘to identify what environmental, health and safety, ethical or societal implications or uncertainties may arise from the use of the technology, both current and future’. A member of the working group made the point that it is not attempting to run the nanotechnology parallel of ‘GM Nation’; rather, it sees its work as the start of an ongoing process. It was also noted that that the group intended to consider recommending how to further engage the public in decision making on nanotechnology. The views of the CS groups were important in this regard.

One attendee said, and several others agreed, that the media would be very important in determining public attitudes to nanotechnology, and that, however the public perceive nanotechnology, the scientific community will have to engage with it as such.

Generic issues that were of concern to CS groups and the public were discussed. These included control of science by the private sector, trust in scientists to live up to ethical standards, and the lack of voice people had in decision-making about science.

This led on to discussion of ‘scenarios’ that might be developed to introduce and communicate nanotechnology to members of the public. A CS representative made the distinction between open and closed systems of innovation in terms of scenario-building. An open system is characterised by pluralist systems of government, public peer review, and adaptive regulatory systems. Examples of open vs closed systems are Linux vs Microsoft, the Soil Association vs Monsanto. The Human Genome Project was highlighted as another example of an ‘open’ system. The potential analogy for nanotechnology was discussed, but it was difficult to think of examples in this area. The working group and some CS representatives agreed that it was encouraging that some sectors of business were now acknowledging the fact that open systems were preferable in that they fostered diversity and innovation.

A number of ways in which scenarios might be constructed were suggested by CS representatives:

- Disruptive technology - to explore the likely impacts on existing technologies, eg in ICTs or pharmaceuticals, etc. on the assumption that nanotechnologies become disruptive.
- Global impact - to explore the impact on poverty in the world by considering issues such as sustainability, distribution of wealth, geographic impact, economic growth, ethics, power, and democracy.
- Open scenario - to explore issues that might arise if intellectual property rights were not exerted e.g. human genome project used this kind of approach.
- Closed scenario - to explore issues of power, given market assumptions based on development of the technology by a few powerful private sector interests.

CS representatives also raised specific scenarios relating to nanotechnology:

- Eradication of disability – for example cochlear implants to improve hearing, improved eyesight for soldiers. A CS representative argued that this was a concern with respect to nanotechnology, particularly in US policies that focus on ‘improving human performance’, and that such technologies contribute to

societal expectation and judgements of what is or is not normal. A member of the working group suggested that, given that these types of improvements (eg glasses, contact lenses) have existed for a while, it could be argued that nanotechnology did not necessarily pose any new ethical dimensions in this area. The working group also suggested that people could be said to have a choice as to whether or not to use these technologies.

Given the fact that none of the attendees were experts in this area, the working group were alerted to the need to seek additional input from a representative of a disability rights organisation.

- Sensors – for example the use of micro and nanosensors in agriculture, which could collect information about farmers' activities and contribute to increased control of their activities. However, it was acknowledged that many farmers are already highly computerised (eg connected to satellite systems).
- Toxicity- the issue of toxicity of nanoparticles was raised as an area in which more research is needed, particularly in terms of whether the regulatory system is sufficient.
- 'Grey goo'. The image of nano robots that can self-replicate has been in the media, and in popular science fiction such as Michael Crichton's novel Prey.
- Military uses

Regulation

In considering how nanotechnology might impact society, the tripartite split of technologies into those that are accelerations, intensifications and radical discontinuities was discussed. The extent to which focus ought to be on potentially radical discontinuities in technology progress, rather than accelerations or intensifications, as these offer the most challenges for regulatory mechanisms, was discussed. A CS representative argued that in fact nanotechnology applied in many areas would intensify existing trends that may be considered societally damaging, and that this intensification was sufficient to warrant concern and the revisitation of regulation as much as any step change. It was agreed by a number of CS attendees that scientists and regulatory agencies needed to work together with other social groups, including non-experts, in order to draw on a wide range of knowledge and identify areas of concern.

New processes

Towards the end of the meeting, discussion returned to the need for a range of new systems and deliberative processes in order to make the introduction of new technologies more democratic and accountable. Suggestions from the CS representatives included:

- A mechanism to bring together a range of citizens including those potentially marginalized by new technologies, scientists and regulators so that new step-changes in science were identified
- A forum in which industry could talk openly about its work and potential developments
- More funding for scientists and social scientists to work together as new technology progresses, for example to understand how an 'open' system may be translated into the work of scientists.

It was noted that one of the recommendations that the working group might think about is what new institutional architecture would be needed to facilitate such systems. It was noted here that there has been a welcome move away from the 'deficit model' assumption of much previous science communication, and that a few years ago engineers and scientists would have been the only ones sitting around the table. There was some encouraging agreement that we are far enough upstream in nanotechnology to put into practice lessons learned from previous technological developments. However, it was also felt by a CS representative that the institutional dynamic between government and the emerging nanotechnology industry is being set

right now and will be fully set within 18 months to 2 years, with government putting an emphasis on speeding development rather than regulating it.

Finally, it was noted that proper resourcing for CS representatives would be important if they are to be able to contribute to future stages of the nanotechnology debate. Unlike large institutes and corporations, grassroots-based CS organisations often have extremely limited financial and human resources to take part in consultation exercises.

Representatives from the following organisations were invited, but were unable to attend

UK Public Health Association
Friends of the Earth
DAART
CancerBACUP
National Consumer Council
Consumer Association
Sustain
Food Commission
Greenpeace UK
Green Alliance
Genewatch
Scientists for Global Responsibility
National Federation of Women's Institutes
Food Aware
Association of Medical Research Charities
National Consumer Federation